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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXX. No. 3239.] LONDON, JUNE 10, 1925. [77TH YEAR. PRICE 1s.

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VOL. CLXX., No. 3239.] WEDNESDAY, JUNE 10, 1925. [77TH YEAR.

INSTITUTION MEETING } A complete account of the week's proceedings will appear in the single issue of the "JOURNAL" published on June 17.

EDITORIAL NOTES.

The Institution Meeting.

If gorgeous weather similar to that experienced last week favours the present one, nothing will be wanting to complete the success of the annual meeting of the Institution. The programme is a full one; and the records at headquarters show that the members are entering enthusiastically into every item. From beginning to end, we predict (given good weather) complete satisfaction on the part of all who will be taking part in the week's events. There is one matter to which reference may be made. Through the stress of the times and the many occupations of our busy men, the MS. of some of the reports and papers which are being presented at the meeting was somewhat belated; and then the intervention of the Whitsun holidays caused further delay to the work of revision and printing. It is not the fault of any one connected with the Council or headquarters that the reports and papers were not available in time for a studied examination by members of their contents well before the meeting. Nevertheless, it is a pity; and this may detract somewhat from the value of the discussions. But the programme is a substantial one; and therefore, although there are to be two afternoon sittings, it will be an advantage if speakers refrain from being discursive and avoid generalities. The maximum result from the time at disposal is what is required.

As this issue of the "JOURNAL" is being prepared for press, considerable interest is being recorded in the Great Hall at the Institution of Civil Engineers. There has been the welcome to distinguished visitors, and to delegates from overseas. There have been the presentation of medals and diplomas for valuable work and successful effort. A sum of £100, we are pleased to note, has been voted by the Institution as a donation to the Lord Moulton Memorial Fund; and worthy additions have been made to the list of distinguished men who are honorary members of the Institution. We have had the address of the President (Mr. J. Ferguson Bell, M.Inst.C.E.), who has worked with characteristic energy to leave nothing undone which could be done to make the meeting of 1925 perfect in every detail. As we close our preparations for this issue, the reports of the various Committees are being taken in hand.

There is a point concerning the visit to Derby. One of the items in the programme for the day's arrangements was tea at Haddon Hall—the famous seat of the Duke of Rutland. Our readers will have read with regret of the destructive fire in the tea rooms at the Hall. The President tells us this will need a modification in the plans, but only a slight one; and on the occasion each visitor will receive a printed slip giving full particulars of the necessary change.

A complete report of the proceedings at the meetings, together with descriptive accounts of the visits and the functions, will appear in the next issue of the "JOURNAL."

Mr. Banbury Ball and Compulsory Electricity Patronage.

It is not every man who is in the position, or would have the courage, to take, in similar circumstances, such a step as has Mr. T. Banbury Ball, the much-respected Engineer and Manager of the Rochdale Corporation Gas-Works. Some electrical people will say he has resigned his office in a fit of pique; those of us who know him intimately, and have great regard for the fine conscientiousness which animates him in all things, will know full well that, when he says the course he has taken is a protest against an ill-advised piece of policy on the part of the Corporation Gas and Electricity Committee, this is the whole truth of the matter. He has given to the Corporation forty-four years' distinguished and loyal service; the act of the Committee which has led to the relinquishing of office, as from August 4 next (which will be the anniversary of the commencement of the long service), shows that such fealty does not count for much with the Committee. The resignation is due to their decision—come to behind Mr. Ball's back, and without any consultation whatever with him—to provide only electricity (instead of the dual services) in sixty-six Corporation houses which are being erected on the Kilworth Street site. While courtesy alone to their old adviser and official should have prevented this secret proceeding, the fact itself suggests that the Committee deliberately wished to take the course they did without his knowledge. The proceeding is so unusual, so out of harmony with considerate and circumspect administration, that the strongest possible protest against it is justifiable. In his letter of resignation (quoted in a later column), Mr. Ball states that no intimation was given to him that the question was under consideration; that he had therefore no opportunity of expressing his views on the matter; and that he is firmly of opinion the tenants of the houses should be free to exercise their own views on the subject. With Mr. Ball's action, there will be both sympathy and endorsement throughout the gas industry.

The incident raises the general question of policy in this matter. Where a Corporation owns, as representatives of the ratepayers, both the gas and electricity undertakings, the ratepayers do not expect that their representatives shall despotically decide for them which form of lighting, heating, and cooking they shall patronize. Things are coming to a pretty pass when, as at Rochdale, these things happen. It is bad enough when a municipality owns an electricity undertaking, and private enterprise has been supplying a town with gas perhaps for the best part of a century, for the Corporation to insist (when they ignorantly think they have the power) upon curtailing the liberties of the people by compelling them to give their custom—not on account of economic merit—to the municipal electricity concern. Even where ownership conditions of that kind exist, Parliament do not look with favour upon such assumption of autocratic power. Their preference is for "free trade" among competing local undertakings or businesses. We cannot

understand business men in any town tolerating the introduction into municipal policy of deprivation of anyone of freedom in the placing of custom. It is a bad principle; and the sooner it is ended the better. One thing it shows is that, having freedom, the major chance is that the tenant would give his preference to gas.

We have said that Parliament do not favour this new policy which has been invented through the possession of electricity trading powers. The tenant of any house within a certain distance of the gas-mains has the right under the general law, providing there is compliance with the prescribed conditions, to compel a gas undertaking to supply him or her. We have not heard of any power being vested in a municipal authority which abrogates that right of a tenant, and shackles him to a form of patronage which is detrimental to him. The Newport (Mon.) Corporation considered they had the power when in 1921 they compelled every tenant of the houses erected on the Somerton Estate to sign an agreement in which there was the condition that the tenant was not to use gas for lighting the premises. That is a case in which the gas supply is in the hands of a Company, and the electricity supply in those of the Corporation. In a Bill in Parliament this session (see *ante*, p. 444), the Corporation sought to obtain power, in connection with all lands and premises under their control, to place upon their use "such terms, conditions, and restrictions, as they may think fit." But a Committee of the House of Commons, in the interests of the freedom of the individual, added this provision: "The Corporation shall not make or impose under the powers of this section, any term, condition, or restriction with respect to the form of light, heat, and power, or energy to be used in any house, shop, office, warehouse, or other building, or on any lands, or with respect to the taking from any particular local authority, company, body, or person of any form of light, heat, power, or energy." The Rochdale Corporation and other local authorities who have any tender feelings for their electricity undertakings, and regard them as fit subjects for preferential treatment at the expense of individuals, should well consider this clause. Their policy which entails enforced patronage may lead to the whole question of the freedom of householders being raised in a very definite form, in view of the position of the general law regarding the right of tenants to demand a supply of gas, and the proper protection of the liberty of the individual against the prejudice engendered by municipal ownership of a trading concern.

Contrary Views.

In industrial polemics, the question at the moment of greatest interest to gas men is the one as to whether or not the competing electricity industry shall receive State aid and preferential treatment from the Government to assist its development. To the suggestion the gas industry is distinctly opposed on the grounds of its unfairness and unproved necessity; and it finds that a large number of long-sighted men in the electricity industry are of precisely similar opinion, and, in fact, hold views in the main according with those to which Mr. D. Milne Watson has given expression in two recent addresses. These, we are pleased to see, have arrested considerable attention, and have helped to promote thought on the subject, throughout the country. But naturally it was expected that there would be a fair amount of opinion in the electricity industry which would be diametrically opposed to that to which the President of both the Society of British Gas Industries and the National Gas Council gave utterance. The anticipation is fulfilled. We notice in one or two electrical papers that there are those in the electrical industry who (if their own industry were not concerned) would declare abhorrence of the principle of State aid to any one industry, but who are to-day searching carefully for excuses for accepting eleemosynary assistance from the State. These people, unlike others in their own industrial world, have no scruples in the matter; and they cannot bring themselves to the acceptance of the idea of rejecting (if offered) benefactions drawn from the pockets of taxpayers, even such large taxpayers as the rivals of electricity in business—the gas undertakings. But, apart from the iniquity of the proceeding—proposed, if not consummated—of the State giving assistance to a well-established and prosperous industry, these same electrical people appear to be so mentally dazzled by the suggested gift that they do not see that it must be accompanied by increased State interference, and, furthermore, that the Labour-Socialists are regarding the condition of State aid as the provision of a further stepping-stone to nationalization. These things are recognized by some wise electrical people, who are strongly hostile to such political schemes, and are ashamed that there should be in the electrical industry men who are willing to sacrifice its independence, and to try to extend its fortunes on political misconceptions and impracticable visions. They know them to be so, and are aware there is little benefit in them for the nation.

As an instance, there is the "Electrician," which, without controverting any of the definite statements and data of Mr. Milne Watson, indulges in a little veiled sarcasm; but it fails to advance anything material to show that his contentions and facts are baseless. As an example, it was pointed out in the addresses that cheap electrical power on the North-East Coast had not helped unemployment in the shipbuilding industry, and that in most industries the cost of power represents only a small proportion of the total works costs. This is how the "Electrician" attempts to counter the fair and sound submission of Mr. Milne Watson: "Electrical development will mean an increased demand for equipment of all kinds, and more raw material and more labour, which will relieve unemployment; and it will enable factories to be started without great capital expenditure, and so cheapen production, and again relieve unemployment." From what has been written in electrical quarters elsewhere, this particular prophet will not in this matter find universal honour in his own country. In the first place, what is meant by "electrical development?" What the politicians have in view is the development on a large scale of the sources of generation and the means of transmission; the idea being that this will cheapen electrical energy at the consumers' terminals. It is no use entering upon development of this sort without a demand can be created. Too much surplus plant and idle capital would be a heavy burden on the industry, and that would not cheapen electrical energy. Also, from the investigations which have been made, it is plain that the concentration of the generation of energy would only affect fuel costs, and any economy in those costs, the sagacious ones tell us, would be swallowed up in increased transmission expenses and losses. That is not the road to the development of electrical demand. The "Electrical Review," on the other hand, cautions its readers against undue optimism with regard to the cheapening of electricity supply as the result of changes in power station practice. Those in the electrical industry who are grasping for Government aid—financial and otherwise—should be sure of their ground before committing themselves. The writer in the "Electrician" further says that "the electrical industry is content to stand or fall on its merits." That is all we want; it is exactly that for which Mr. Milne Watson, in the name of the gas industry, is contending. It is only asked that the gas industry shall be kept free from State-aided competition—that the electricity industry should be "content to stand or fall on its merits." It is well that the gas industry should make this point clearly and forcibly before the Government positively determines to take the objectionable course; we hope the determination will be in the opposite direction.

We get much the same sort of criticism in "Electrical Industries." The editorial writer in this contemporary finds Mr. Milne Watson's comments "amusing." He does not cite the points that are so; and he deliberately descends to saying what is untrue when he asserts that the address to the Society of British Gas Industries "was one long protest against the popularity of electricity." It was nothing of the kind—not even inferentially. How it could be, we do not know, seeing that, a line or two further down in the comment, it is remarked that "Mr. Watson and other speakers *concentrated* upon the evil designs of the Government in 'bolstering-up' electricity." Our contemporaries who take the opposite view to the gas industry and to many competent electrical men appear to be unable to apply either logic or connected argument to the subject. The same paper says that it does not seem that the electrical industry needs "bolstering-up;" but "that it should be supported as a general benefit to the country, we cannot find it in us to condemn as iniquitous." There is plenty of evidence that the industry does not need "bolstering-up."

The several large generating stations that have been recently inaugurated, as well as the fat, unregulated dividends paid by many electricity concerns, prove this. It is difficult—indeed, impossible—to understand what possesses politicians who think that it does. However, we cannot see any difference between being "bolstered-up" and being "supported" by the Government. The opinions even of electrical experts are not in unison as to either the "bolstering-up" or the "support" of the Government being "a general benefit to the country." The iniquity lies in the proposal (if carried out) to give preferential State aid to a sheltered industry, without any proved need or national advantage. On the other hand, we have "Chemistry and Industry" writing in well-reasoned manner against State aid for any established industry.

It is not electrical power that will disperse the cloud of industrial depression. There are other factors more deeply rooted and widespread which require to be dealt with by the Government in the general interests of industry; and success in dealing with them would affect all industries alike, and so contribute to a common movement towards greater prosperity and relief of unemployment. Here, however, we have politicians contemplating, and endeavouring to persist in, a course which competent intellects believe is likely to do more harm than good. It was high time that a serious protest was made; and we are glad to find electrical men joining in it, and not being deterred from doing so by the flounderings and platitudes of some of their fellows.

A Cabinet Electricity Committee Appointed.

AFTER the foregoing article had been written, information came to hand to the effect that a Cabinet Committee has been appointed, under the chairmanship of the Attorney-General (Sir Douglas Hogg), to examine and report upon the electricity scheme drawn up by Lord Weir, Lord Forres, and Sir Hardman Lever. This course has been taken because it is believed that the matter could have more detailed consideration by a Committee than by the Cabinet as a whole. Thus final determination of this highly technical problem is to be of a political order. Perhaps this cannot be avoided. However that may be, there appears to be a disposition to push forward legislation. A preliminary draft of a Bill is being prepared by the Ministry of Transport for consideration by the Cabinet Committee; the hope being that the measure may be introduced before the summer recess, and carried through during the autumn. On the scheme generally, the Parliamentary correspondent of the "Daily Telegraph" makes this statement: "It is expressly disclaimed that the Government's proposals are on the lines of nationalization, because, while the State *will assist* in the great national developments that are projected, private enterprise will continue to be entirely responsible for the generation of electricity." If this is a true reflection of what is proposed, it indicates an intention of the Government to "assist" financially in the work of reorganization. One object is stated to be the gradual standardization of output, so as to facilitate the progress of linking-up the various generating stations. It is further presaged that the country is to be divided into areas, with provision for regional grouping of the electricity undertakings. By such means as these, together with the closing-down of the smaller stations, supplying the districts from super-stations, and carrying distributing systems into virgin areas, it is thought that it will be possible to ensure "cheaper power for industries, as well as cheaper current for domestic purposes." There opinions differ. If these indications prove correct, they will show that there are leakages somewhere, though the Weir report is supposed to be safely guarded until a scheme is finally adopted by the Government.

Coke and Sulphate in the Showrooms.

Is sufficient use made of our showrooms? That is a question that was asked in a paper read by Mr. H. D. Madden, of Cardiff, before the Wales and Monmouthshire Institution of Gas Engineers, as reported in this issue. We live and learn. The development of showrooms is the subject of evolution, the same as is that of most other things. In their case, the best development is made by the studied consideration of the purposes to which they are, or should be, devoted, and in most cases, the application of thought and inventive faculty will suggest means whereby they can be put to maximum profitable use. Mr. Madden's paper indicates various ways in which this can be done.

One part of the contribution we should like particularly to emphasize. There is a disposition in practice rigidly to follow the title of "gas showroom," and to utilize them only for demonstrating the merits of the various applications of gas. That is a limitation which amounts to short-sightedness. The gas showroom and its work, as well as the undertaking owning it and the consumers of gas, require the primary commodity to be at as low a price as circumstances will permit. We are passing through a period when secondary products are not yielding all we should like them to do for contributing to a low net cost per therm into the holder. To this end Mr. Madden's advice is to make use of the showrooms to give—particularly to coke and sulphate of ammonia—the largest possible publicity. But it must be publicity with the "goods" exhibited in a proper way, and suitably prepared for different services. As we travel about and make inquiry into this matter, it is found that in some areas anything that can be classified as coke is considered good enough for the market, and the indifference to cleaning and grading is something that is really calamitous to the building-up of a good trade in the commodity. We have no doubt it is the same in many parts of Wales as we have found it in several quarters in England. What Mr. Madden therefore recommends is that coke shall be given both the attention it deserves and the publicity it warrants; for, when properly prepared, it is an ideal smokeless fuel. He urges that the best coke possible should be manufactured by the use of selected and blended coals. In this connection, it is not always wise to give preference to the cheapest available coal; it is the ultimate cost of gas into the holder that matters, and in that coke plays an important part. Given good clean coke in graded sizes for all applications, prominent publicity in the showrooms, with appropriate literature at hand, and this fuel will begin to create a new demand for itself. Stress is also laid on the point that the showroom staffs must be in possession of correct knowledge regarding the suitability and uses of the different graded sizes, and be able to advise consumers and inquirers. Cardiff has found excellent benefit from these practices.

We congratulate the Company, too, upon what has been done in stimulating the sale of sulphate of ammonia in small quantities by giving prominence to it and its virtues in the showrooms. Only recently they commenced to offer neutral dry sulphate in 7-lb. linen bags, with instructions for use printed on the back. The product was shown and advertised in all the showrooms; and in a few weeks, more than 1500 individual sales were made. There have been heavy local purchases; and the radius from which inquiries now come has enlarged—due entirely to publicity, in which the showrooms take a part which cannot be over-rated.

More on these subjects will be learned from the paper. The Cardiff experiences authorize Mr. Madden to advise emphatically: "Never cease to hammer in the facts—Tell the world."

Gas Workers' Wages.

To-morrow is the day fixed for a further meeting of the National Joint Industrial Council for the Gas Industry to discuss the wages question. The position in which the matter was left on April 28 last was an agreement that no action on either side should be taken until the end of June.

Mr. Dunn's Thirtieth Annual.

Looking up a matter in the "JOURNAL" volume for 1896, it was noticed that the Annual Meeting of the Institution of Gas Engineers that year was the first at which Mr. Walter T. Dunn was present as Secretary. The one this week is therefore his thirtieth; and it promises to rank in interest with the best of those that have been held during the three decades. Hearty congratulations to Mr. Dunn, who, as the permanent official of the Institution, has done so much to help to mould its history.

Nearing the Date.

Papers for the Coke Competition must be delivered to the Editor of the "JOURNAL" on or before June 30. The conditions set forth in the "JOURNAL" for Feb. 18 must be observed.

Wembley.

The beautiful weather last week showed what a potent influence sunshine has upon the attendance at the British Empire Exhibition. The number of visitors on Bank Holiday alone was close upon a quarter of a million, and that was not by any means one of the most charming days of the week. The Gas Exhibit is securing, as it deserves, a large measure of attention; and, consequently, there is great satisfaction on the part of all who have had a share in its organization. Another feature has been introduced near the Exhibit. The enterprise of the Gas Light and Coke Company has brought into being a coke demonstration, regarding which particulars are given on a later page. At the sign of the "Jolly Jack Tar," the use of tar for road purposes is also being illustrated; and everybody is speaking of the attractiveness of this, as they are doing of the Gas Exhibit. The gas industry has made wonderful progress in the art of demonstration during the past few years; and for this there are men to whom we owe a large debt of gratitude.

Why that Big Span?

The question has been asked by many people why such a large span as 280 ft. is required for one of the sections of the temporary Waterloo Bridge. The secret has been divulged. It is that the Port of London Authority desired the London County Council to make it of those dimensions, in order to avoid the appearance of a "tunnel approach" at a portion of the river where it makes a bend, and where it is necessary there should be ample room for the navigation of steamers of 2000 tons, carrying coal to the Wandsworth Gas-Works. The growth of the gas industry has an influence even on bridge-building.

Mains of Insufficient Capacity.

In a note last week (p. 650), and in our "Parliamentary Intelligence," reference was made to the new mains-of-insufficient-capacity clause which has been agreed with the railway companies, and which will now be the one to be adopted in gas Bills and Orders. It has since struck us that, in the satisfaction of having this troublesome matter settled, no mention was made of the part taken in it by the little Pinner Gas Company, who valiantly, at their own cost, "stood-up" to the railway companies, and paved the way to the negotiations which have ended in the agreed clause [*ante*, p. 677]. The story of the part taken by the Pinner Company will be found in the issue of the "JOURNAL" for Aug. 6 last [p. 524]. In the negotiations which followed, the National Gas Council looked after the interests of the industry.

The Proposed Labour Alliance.

The great labour alliance which the extremest section of the Executive of the Miners' Federation desires to bring about is not going to be effected with a rush—if at all. There was a conference last Thursday between the representatives of the unions concerned. It was a big affair—105 delegates being present, representing 2,500,000 workers. The discussion is said to have been "animated," and to have continued for some two-and-a-half hours. The prime mover is Mr. A. J. Cook, whose aggressive and militant speeches about the country have not been to the liking of those trade union leaders who believe in operating in a constitutional manner. It is stated that there were clear signs at the conference that the miners' group had expected a more prompt response to their plans. But the feeling was that more information was required; while other unions were not going to be hustled into anything which might commit them to strikes to force demands of other unions, which might be hostile to the interests of their own members. For example, the miners' leaders at the present time are seeking a new wages agreement, and certain of them are anxious that the men should get more money with no obligation as to more production. This would mean increased cost of coal and a still lower demand from overseas; and such conditions would be injurious to employment in the very industries with the unions of which the miners are seeking alliance. From within the mining industry, evidence has come that the men can earn more money by increasing the production per shift. At the time of the last Trade Union Congress, the Miners' Federation had a membership of 750,000; the National Union of Railwaymen, 325,000; the Associated Society of Locomotive Engineers and Firemen, 59,000; the Transport and General Workers' Union, 295,000; and the Amalgamated Engineering Union, 245,000. These are among the Unions represented at the conference last Thursday. The desire for further information was general; and for this purpose it was decided to appoint a Committee. The resolution passed was as follows: "That in the opinion of this conference—having regard to the present industrial situation and the community of interests that must necessarily prevail among the organized workers—the furtherance of this movement could be best served by the appointment of a Committee to consider the suggestions submitted to the conference, and that each group of industries appoint two representatives to serve on that Committee, their names to be forwarded to Mr. Cook."

Nationalization of the Mines.

The Executive of the Miners' Federation have again been discussing the question of the nationalization of the mines, and have selected nine of their members to join a Committee of Inquiry, comprising three representatives from the Trade Union Congress, three from the Parliamentary Labour Party, and three from the National Labour Party. This Committee are to discuss the question of drafting a Nationalization Bill, which is to be regarded as the policy and programme of the Labour and Trade Union Movement. The Bill is to be the joint product of the miners and trade unions, and it will go a step farther than the miners' own Bill which not long ago was rejected by Parliament. The same fate will no doubt await the new Bill; but it will be of interest as mirroring the plans of Labour should ever they get a working majority in the House. A circular inquiry in the mining districts, it is stated, has resulted in a majority decision against any payment being made for minerals and royalties.

PERSONAL.

On Wednesday, June 3, at All Saint's Church, Rochester, was solemnized the marriage of Mr. LESLIE W. DUNN (elder son of the Secretary of the Institution of Gas Engineers) with Miss Sybil Beaney, elder daughter of Mr. R. J. Beaney, of Rochester. Hearty congratulations and good wishes to the happy couple.

In the pass list of the April examination for associate membership of the Institution of Civil Engineers appeared the name of Mr. W. J. COLLINS GARRARD, Second Assistant to Mr. Frank Prentice at the Ipswich Gas-Works. Mr. Garrard, who is the son of Mr. James S. Garrard, Secretary to the Eastbourne Gas Company, has now passed the whole of the examination.

RESIGNATION OF MR. T. BANBURY BALL.

An extraordinary position has arisen at Rochdale, following upon a recommendation of the Gas and Electricity Committee that electricity only shall be supplied to 66 Corporation houses that are to be built. As a protest against this policy, which he considers seriously injures the prospects of gas in other directions, Mr. T. Banbury Ball, who has for close upon 44 years been Manager of the Gas-Works, has resigned this office; and his resignation has been accepted with great regret—the Gas and Electricity Committee expressing their warm appreciation of the services he has rendered to the Corporation over this long period. Mr. Ball's views on the subject were clearly expressed in his letter of resignation, which was in the following terms:

> The Gas and Electricity Committee having decided to exclude gas from the 66 houses recently contracted for on the Cheltenham Street housing site, thereby seriously injuring the prospects of gas in other directions, I feel that I cannot continue to hold any longer the office which I have had the honour of filling nearly 44 years, and therefore beg to tender my resignation.
>
> No intimation was given me that the question was under consideration, so I have had no opportunity of expressing my views on the matter; but I am firmly of opinion that the tenants who are compelled by circumstances to occupy these houses should be free to exercise their own views as to what system of lighting, heating, or cooking they prefer.
>
> You will realize, I am sure, that I am taking this step with infinite regret; but I look upon the decision of the Committee in the matter as so serious that I have no other alternative.

It is understood that every effort was made by the Gas-Works Sub-Committee to induce Mr. Ball to reconsider his

decision; but he felt that he could not conscientiously do so in face of a policy which he regarded as inimical to the interests of the department for which he is responsible. The resignation then, as already stated, was regretfully accepted at a special meeting of the full Committee. At the conclusion of the meeting, the Chairman (Alderman Blomley) personally conveyed to Mr. Ball an expression of the high regard in which he is held by the Committee, and their great regret that they had no option but to accept his resignation most reluctantly. General regret at the necessity for so drastic a step on the part of Mr. Ball is felt in the town, where he is greatly esteemed for his courtesy and high integrity of character.

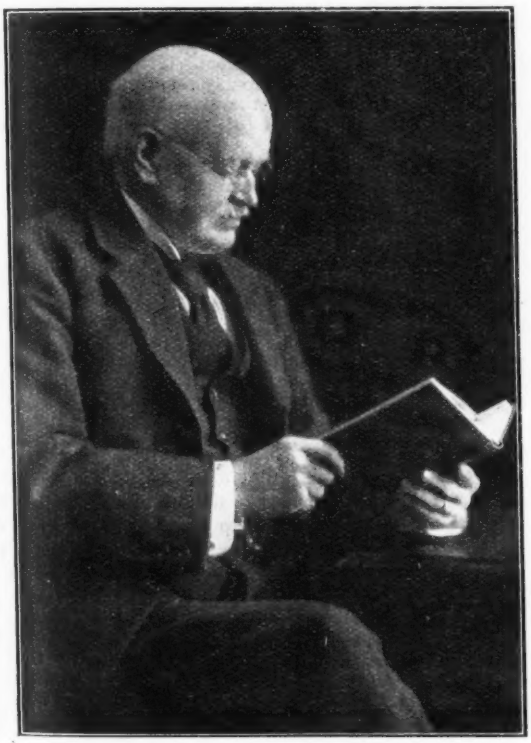
Mr. Ball has spent the whole of his working life in the gas industry; his first appointment having been at Jersey. In 1875 he transferred his services to the Leeds Corporation; and in August, 1881, he went to Rochdale. He is now 74 years of age. Practically the whole of the existing gas-works plant at Rochdale has been installed or re-modelled under his management.

The matter was debated by the Town Council last Thursday; and a report of the meeting is included in our news columns to-day.

OBITUARY.

ROBERT HALL BEST.

It is with regret that we record the death, which occurred on Monday, June 1, at his residence, No. 146, Hamstead Road,



The Late Mr. R. H. Best.

Handsworth, Birmingham, of Mr. Robert Hall Best, of Messrs. Best & Lloyd, Ltd., gas and electric light fittings manufacturers.

Mr. Best was born in 1843, and succeeded early to an important position in the firm with which he had been connected ever since—as part proprietor till 1878, then sole proprietor, and since 1879 as Chairman of Directors. It was his father, Mr. Robert Best, who founded the business. Although never a prominent public man (in spite of the many efforts to induce him to become a candidate for municipal and other honours), the deceased's social, educational, and philanthropic activities in Birmingham were many, and his influence in matters relating to art and industry in the brass trade went far beyond a local application.

Particularly was this the case with the results of his investigations into the economic conditions of the brass trade in Germany. Largely at his instigation, the self-constituted Commission consisting of Mr. W. J. Davis (then Secretary of the Brassworkers' Society), the late Mr. C. Berks, and himself, went over to Berlin on a tour of inquiry and research. The resultant report had a wide circulation, and stirred public opinion greatly. Long years of travel on the Continent, and his intimate touch with German manufacturers, convinced him that the Germans were not in the very retrograde state of civilization and development nearly everyone then thought; and Mr. Best was largely instrumental in inculcating a more general realization of the fast-growing efficiency in their manufactures, of their formidable business organization, and of their thoroughness in matters educational and scientific. He thus drew attention to the growing menace to our trade which Germany represented, and the need for rousing ourselves from lethargy in methods of education, as well as in the production and marketing of commodities, if we were to hold our own.

His next great work was propaganda for secondary education and trade schools. Here, again, he went to our trade rivals in Europe for example and precedent, spending a great deal of time in thorough investigation of these institutions in Germany—particularly in Munich. He brought his research to a head in a book he wrote in collaboration with Mr. C. K. Ogden, B.A., of Magdalene College, Cambridge, entitled "The Problem of the Continuation School." His main aim was to avoid the loss of training occasioned by so large a proportion of boys drifting into blind-alley occupations, and to replace it with wise education on broad lines; using trade classes as a focus of interest and a starting-point. It was not by any means purely vocational training he was after; the duties entailed by citizenship and the wide diffusion of simple economics and history, were, he thought, far more necessary for the training of an alert and efficient industrial people. He supplemented his writings on this subject by a great deal of lecturing; and his efforts only just missed bearing practical fruit in the brass trade. A school was about to be started in Birmingham, along the lines recommended by him, when the war broke out, and set-back the clock of progress in so many directions.

Another much needed reform for which he laboured was the application of art training to industrial needs. He was profoundly disappointed and discontented with the activities of art schools in the direction of improving design in industry, and worked hard for the linking-up of the art teaching in Birmingham with the manufacturing needs of the city.

His work as a town councillor for Handsworth was brief, and occasioned only by a disagreement of a section of the inhabitants of Handsworth with the proposal to include that suburb in the city's boundaries. He was strongly in favour of the greater Birmingham scheme, which came to fruition in 1911, and defeated his opponent at the Council election which was fought on that issue.

For many years Mr. Best had been President of the Brassfounders' Employers' Association, in which position his activities were highly appreciated by employers and employees alike. He was a man of wide sympathies, and of great knowledge.

His wife predeceased him in 1921, and his second son, Frank Behrens Best, was shot-down while flying over the enemy lines in 1917. He leaves one son—Mr. Robert Dudley Best.

We regret to hear of the death, at the advanced age of 91 years, of Mr. WILLIAM GARTON, formerly Accountant to the Nottingham Corporation. Although identified with the Nottingham gas undertaking for the long period of 63 years, he had, previous to that association, been in the service of Mr. William Hunt, Solicitor, of Nottingham, Clerk to the old Company. Upon the retirement of Mr. Garton five years ago, he was appointed Consulting Gas Accountant. Extremely conscientious in his duties, he was a man of great integrity, and a highly respected official of the Corporation.

The death occurred, suddenly, on the 3rd inst., of Mr. E. F. SPURRELL, Borough Engineer of Holborn. To Mr. Spurrell the newly-formed Institution of Public Lighting Engineers owed its inception; for it was he who, in the autumn of 1923, seeing the need of such an organization, called together those he thought might be interested. When the Institution was launched, he became a member of the Council, which position he held at the time of his death.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

June 12.—INSTITUTION OF GAS ENGINEERS.—Visit to Derby. Members should note that the luncheon will be in the Drill Hall, Derby—*not* the Assembly Rooms, as indicated in the programme.

June 19.—INDUSTRIAL GAS SALESMEN'S CIRCLE.—Meeting at the Council House, Birmingham. Inspection will be made of the industrial gas demonstration rooms and research laboratories of the Birmingham Gas Department, and visits will be paid to the Windsor Street heat treatment shops, and to the works of the Moss Gear Company, Ltd.

June 20.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Visit to the Cambridge Gas-Works.

June 30.—LAST DAY FOR COKE COMPETITION PAPERS.

ELECTRICITY SUPPLY MEMORANDA.

IN the last issue of the "JOURNAL," there appeared a letter from Mr. J. Horace Bowden, the Electrical Engineer of Poplar, which dealt with our recent comments on the charge for electricity for heating water for the public baths at Poplar, and on the waste of coal which results from the use of an agent produced at such a low efficiency as is represented by (so it now transpires) 2½ lbs. of coal per KW.H. Assuming the coal has a heating value of 13,000 B.Th.U. per lb., the production of 3420 B.Th.U. per 32,500 B.Th.U. in the coal would be equal to 10·5 p.ct. efficiency. We should like to preface further remarks by saying that "impudent stunt" and "real live" Electrical Engineer of Poplar were quoted in our comments and were expressions published in electrical papers. Our readers will remember that an electrical paper made the claim that the heating by electricity of the water for the Poplar baths was cheaper than by gas, and that was why gas had been "thrown out." The comparison was made with gas at ordinary price and electricity at a charge representing average fuel costs or thereabouts—no other cost being included. No one can legitimately claim that this is an ordinary commercial transaction; but Mr. Bowden is not different from other electrical engineers in adopting extraordinary arguments for justifying what he is doing. We have not the slightest doubt that this public bath water-heating business is purely preferential because it is a municipal undertaking. The current being taken at off-peak periods, our correspondent calls the supply "a bye-product," and says it must be regarded as such. The suggestion is a remarkably subtle one; but we have a notion that the Poplar Borough Council Electricity Committee would be rather reluctant to supply electrical heat on the same terms during off-peak hours for other purposes. But why not, if it is such a good thing for the undertaking? We see that the electrical energy for the public bath water heating is supplied between the hours of 5 and 8 a.m. (which covers breakfast time), and between noon and 2 p.m. every day and after 1 p.m. on Saturdays. Those times would cover the dinner period for most people in Poplar. Then why not sell the "bye-product" for domestic cooking at average fuel costs? The bye-product argument can be beaten-out to diaphanous substance. Why, too, select fuel costs only for averaging-out in order to decide the charge for supplying heat to the water for the public baths? The trick of averaging the fuel costs over a large consumption basis, and the other costs over a small consumption basis, and making the latter pay all the "other costs" is not equity.

Poplar Bath Water.

Mr. Bowden claims that this sort of supply is a bye-product, and must be regarded as such; and he says that in the gas industry bye-products are worth exactly what they will fetch in the market. That is a perfectly philosophic and yet obvious statement. Applying it to the off-peak-load electrical "bye-product," it is clear that this will not fetch much per unit in the market, and the same applies to electric cooking and heating and much of the power business—not all off-peak loads. Mr. Bowden is ingenious; but he has overlooked the fact that there is no analogy between his bye-product and the bye-products of gas manufacture. Every one of our bye-products stands in a different class. They are not the same as Mr. Bowden's "bye-product," which is in every respect identical with his primary product; and the only excuse he can find for calling it a bye-product is in the incidence of its use in respect of time. In the case of our secondary products, every charge in their preparation for the market is accounted for in the price; and Mr. Bowden cannot show us any case in which the whole of these charges are not fully covered by the revenue, even in this time of poor markets. It is only because the profits are less from the secondary products that the aggregate sum to be deducted from the gross cost of coal leaves the net price of the latter at a figure which has compelled in some cases the raising of the price of gas. But we cannot detect any real profit in Mr. Bowden's electricity "bye-product;" and, anyway, the price charged shows that it is a "bye-product" of exremely low intrinsic value from the heating point of view. He would not charge that price if it could command a higher one. Gas undertakings are not so foolish as to sell gas at the "average net cost of coal." If they were, the Gas Company supplying in Poplar would have been able in 1924 to sell at about 2d. per therm—the net cost of coal having been 1·848d. per therm. To obtain the same potential thermal value from electricity rather more than 29 KW.H. would be required. Differential prices do obtain in the gas industry for different services; but not such differential ones as are the vogue in the electricity supply industry. It would, of course, be possible to sell gas at convenient times at a little over net cost into the holder; but then there would be distribution and other charges which would have to be borne by the consumers generally. Those charges exist in all manufacturing establishments, including electricity undertakings; and in many manufacturing works, including gas undertakings, there are times of the year when a large part of the plant is standing idle. Even in winter time there has to be a good margin of gas plant to meet the vacillations of the heating load, which are often of a somewhat violent order. There are not, therefore, such extraordinary differences in electricity supply and gas supply as Mr. Bowden pictures in, we think, shallow fashion for the purpose of justifying a charge for water heating at a little above the average cost of fuel—leaving the burden of other costs to be borne in other quarters. We are not shivering over his prospective raising of steam from the waste fuel of collieries. When he uses it in his boiler furnaces, he may find that it would be rather a good thing to employ a proportion of gas coke on (say) the Sandwich system, in order to get a porous, free-burning fuel bed.

The "Bye-Product."

Mr. Bowden's letter does not deal with the question of extravagant heat expenditure for raising the temperature of water by electrical energy, beyond the incidental remark as to the use under his steam-boilers of waste fuel from collieries. We had therefore hoped that, if Mr. L. Jefferson-Hope, the Chief Superintendent of the Poplar Borough Baths and Wash Houses Department, replied to our criticisms, he would have discussed this particular point, which is one of extreme importance in connection with the utilization of fuels for any purpose. He contributes a letter to this week's issue of the "JOURNAL;" but he entirely avoids making any point of our criticism regarding the larger tonnage of coal required to do a certain amount of work the electrical way than is needed by using the fuel directly under a steam-boiler. It is perfectly obvious this would be so when one considers the efficiency of a boiler; and then, using the steam for electricity generation, note how the efficiency tumbles down to an extremely low point—in the case of Poplar to about 10½ p.ct. of the original thermal value of the coal. Instead of dealing with this technical matter (which is to-day regarded as being of vast importance in connection with the conservation of coal and the co-ordination of the use of our fuel supplies), he tells the story of how the Gas Company supplying in the district missed this particular load. This is, of course, interesting up to a point; but it does not bear upon the general question of whether or not electricity, from either the thermal or cost points of view—if a fair commercial charge is made—is a rational method of providing heat for raising the temperature of water. In passing, it is observed that our correspondent states that coal-fired boiler plants are uneconomical for his particular purpose on account of the intermittent character of the business. However, we thank Mr. Jefferson-Hope for his work in favour of gas heating, though this did prove abortive; but really there is nothing in his communication which calls for a reply from us, as the policy of the Gas Company in respect of this particular load is not a matter which would lead to any profit by being discussed in our columns.

An Important Point Avoided.

On various occasions we have advocated that more information should be supplied to the daily and weekly newspapers as to the technical position and progress of the gas industry in the utilization of coal, as well as in the application of its products to domestic and industrial services. We suggest that there is a writer on the staff of the "Yorkshire Post" who requires a little light and leading on this subject, for he has given the best possible certificate to the need that anyone could possibly pen. An editorial article appeared in the "Post" on the subject of "The Government and Electricity." Mr. Arthur Bray wrote to the Editor protesting against the ignoring in the paper of the great advantages that gas has over electricity in lighting, heating, and cooking. He also criticized the suggestion that electricity should be subsidized at the expense of gas, and pointed out that the arguments in favour of subsidization could be applied equally to gas undertakings as to electricity supply ones. But he cannot see why either should be assisted; his preference rightly being that both should work in healthy competition. Among other points made by Mr. Bray was that, if all the houses in Leeds were equipped with gas appliances for heating, cooking, and hot water supply, four-fifths of the pollution to which the editorial writer referred would disappear, and the pockets of householders would on balance greatly benefit. In an editorial note appended to the letter, there is displayed a want of knowledge which is to be deplored in a paper of such influential standing as the "Yorkshire Post." Allusion is made to Mr. Bray's statement as to four-fifths of the pollution of the air being removed by the use of gas; the editorial note writer saying five-fifths would be removed by the universal use of electricity. Of course, Mr. Bray did not intend his "four-fifths" to be regarded as a definite proportion. He knows what apparently his critic does not, that in industrial work it is impossible to eliminate entirely the use of solid fuel; so that there could be no universal application of either gas or electricity for industrial heating. Electricity cannot do more than gas in purifying the atmosphere, and as a matter of fact it would be ruinous to individuals and disastrous to the country at large to attempt it.

Educate the Daily Newspapers.

An Unsupported Statement.

This brings us to the most important statement of the writer of the editorial note. He says: "Our leading article suggested that electricity which serves both the domestic and industrial purpose could, under a well-co-ordinated national scheme, be produced and distributed at a unit cost sufficiently low to help industry and ease the burden of the householder, whereas it is now impossible to co-ordinate coal and gas supplies." Our contemporary will excuse us pointing out that the statement is wholly senseless. We should like to know the grounds, supported by data, on which he bases the suggestion. There are physical obstacles in the way of electricity being produced at a unit cost sufficiently low to make its use universal for heating; and the waste of our coal resources would soon show itself in a manner so appalling that the writer in the "Post" would wonder why he had been led to entertain such fantasy as he declares possesses him at the present time. He considers, too, that gas is a form of power which is rapidly becoming obsolete. We should be most happy further to discuss this matter with the writer in our contemporary, if he will supply us with the grounds upon which he bases his dogmatic assertions. But we would suggest to him that in a technical discussion it is rather childish to write thus: "It must, in conclusion, be admitted that electricity will never be as efficient as gas at leaking from faulty lead piping to the benefit of the gas undertaking's receipts and the detriment of the unsuspecting ratepayer and his family."

WEMBLEY AND THE ARTS OF DISPLAY.

Sir Lawrence Weaver's Book.*

The British Empire Exhibition affords a unique opportunity for the study of a type of publicity which has for too long in this country been practised without being understood. Sir Lawrence Weaver, Director of United Kingdom Exhibits at Wembley, has published this spring a book which should prove of permanent value in preserving many of the lessons that Wembley is able to teach us. He sets out to consider solely the question of display, but without digressing from his argument he provides incidentally much information and criticism on many aspects of exhibition work; and his 366 beautifully reproduced illustrations serve admirably to drive home the points. To the gas industry, moreover, because the industry both was and is so well represented at Wembley, the book has a special interest.

Why is it fair to say that the arts of exhibiting are not understood? Because the object of an exhibition is so rarely grasped. Not only the man in the street, but the exhibitor himself is constantly heard to ask: "Does such-and-such an exhibition pay?"—meaning, of course, "Can you trace any definite results directly to it?" The question is proof at once of the failure to understand its object. For the object of exhibitions, as Sir Lawrence Weaver says, is "publicity, not sales;" in other words, they are, like other kinds of advertising, a casting of bread upon the waters. The exhibitor should aim not at meeting the immediate needs of those who visit his exhibits, but at leaving upon their minds an impression which will be remembered when at some future date a need is felt. The crowds, for example, who daily pass through the Wembley Gas Exhibit have not gone there to see if gas can solve this or that problem for them; they are for the most part casual wanderers "seeing what there is to see," pausing wherever something picturesque, or something wonderful in size, in colour, or in movement, may happen to arrest them.

This is the reason why, at an exhibition designed for the million, it is wrong to display all your wares or products in uninspiring rows, and why it is right to give some picture such as the Gas Exhibit Committee have evolved, which pleases and educates, but does not pretend to say: "Here in a nutshell is all that the gas industry can do."

Admit but this, and it follows at once that the success of an exhibit depends very largely on the "arts of display," in which, as Sir Lawrence Weaver says, "no artist is too good to be employed;" and the same will apply to the architect. Sir Lawrence Weaver illustrates this well from last year's Wembley Exhibition—and, much more easily, from the Munich and Gothenburg Exhibitions of 1922 and 1923; for in Germany the value of originality and art were recognized far better. The value of art can be illustrated again from an exhibit new to Wembley this summer—that delightful and arresting scene of the road beside "The Jolly Tar," which winds away upon the backcloth into the hills painted by Norman Wilkinson, and is perhaps the most effective exhibit of its size in the whole Palace of Industry.† And the Gas Exhibit itself, last year's display—and how much better this year's!—is cited by Sir Lawrence Weaver as one of the best examples in the whole Exhibition.

To us his comments have a special interest. With obvious sincerity he points out that "the success of an industry's display will normally depend upon the more or less complete community of interest between the participating exhibitors. The ideal is achieved when the participants are prepared wholly to sink their individuality, and to concern themselves only with the ideal presentment of the scope and possibilities of their industry"—when, that is to say, they recognize that their object is "publicity not sales." The ideal is, however, in the author's view, not readily achieved "save in the case of a widespread public service such as the gas industry;" the fact, of course, being that the gas industry has to an unparalleled extent established, not merely for exhibition purposes, but for all its activities, a system of genuine co-operation which has the right spirit behind it. The result, to quote Sir Lawrence Weaver, is that "the whole Exhibit was organized in the interest of all gas undertakings, whether owned by companies or municipalities, including many outside the United Kingdom"—and, he might have added, equally in the interest of all the appliance manufacturers. "Its anonymity," he continues, "added to the conviction of efficiency and service which was impressed upon the minds of visitors, due in no small measure to the skill with which Mr. Austen Hall, the Architect to the Committee, had planned and decorated a charming co-ordinated display."

Such is Sir Lawrence Weaver's praise for the Exhibit of last year. He would be bound to speak even more highly of "the second edition." For in his concluding chapter on "Exhibitions of the Future," he has made an appeal not only for that "harmony of display," that co-ordination which was already a striking feature of the Gas Exhibit, but also for better lighting, better velaria, more invention in colour schemes, and, above all, more movement. In every one of these respects the Gas Exhibit, 1925, has gone one better than its predecessor—and the Exhibit of last year was good enough to be deemed worthy of nineteen pictures in the book, one of them a whole page in colour, showing the spacious and artistic Rest Lounge.

We said that Sir Lawrence Weaver was not guilty of digression. We admit an exception, but forgive it. He has a chapter on the Exhibition posters; and in that chapter one concluding paragraph which deals with the posters used by individual exhibitors. It is worth quoting in full:

> "And when the posters issued by the Exhibition authorities themselves are detailed, the story is by no means told. Many fine posters were used by exhibitors themselves to advertise their wares or to call attention to their display in the Exhibition. For the most part, and naturally, letterpress posters best served their purpose, but in one case they indulged, with particularly happy effect, in the work of a very able poster artist. I refer, of course, to the very striking poster by Mr. Septimus Scott, issued by the British Commercial Gas Association, and entitled 'The Spirit of Coal.' Starting as a sixteen sheet, it proved to be easily the most ubiquitous of the Exhibition posters. It rose flaming from the hoardings. It looked down from the sides of houses. As a double-crown it found its way into the railway stations, and in still smaller form it adorned the advertisement pages of newspapers and magazines."

High praise. But was it not deserved?

* "Exhibitions and the Arts of Display," by Sir Lawrence Weaver, K.B.E. Published by the Proprietors of "Country Life," No. 20, Tavistock Street, Covent Garden, London, W.C. 2. Price 30s. net.

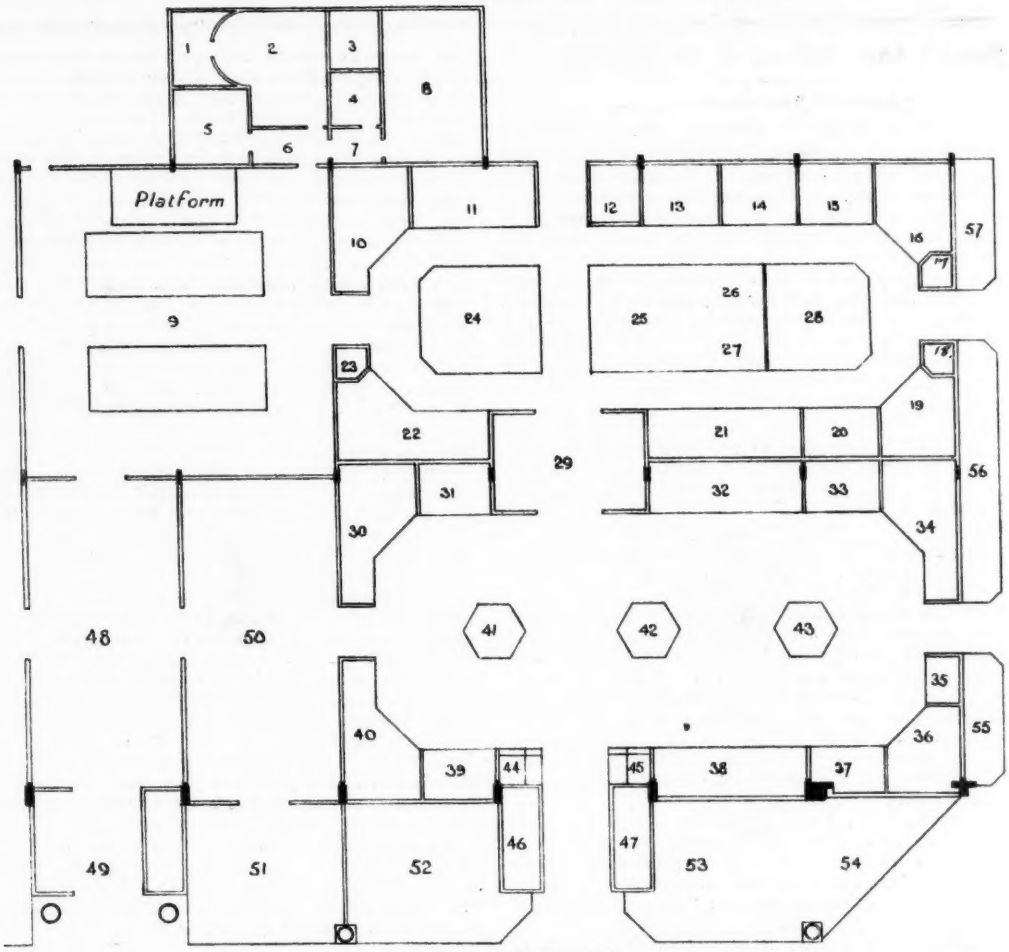
† The National Gas Council's "British Tar for British Roads" Exhibit in the Chemical Hall (described and illustrated in the "JOURNAL" for May 13).

Card Printing Cheapened by Gas.

Many people, says "Industrial Gas," met for the first time last Christmas the engraved process cards and announcements; and they wondered how it was possible to produce such cards so cheaply. This engraved process printing consists of printing with an ordinary press; and this is followed by a heating operation. A slow-drying ink is used in the printing, and then the cards are dusted with a resin or shellac base powder. An automatic shaking operation removes all the powder except that which sticks to the wet ink. The cards are then heated in an oven, and the powder becomes merged into the ink. In this process a uniform heat zone of correct temperature is essential. Any variation in the heat zone temperature while the work is in progress will result in spoliage. Electricity was first used as a heating medium; but owing to the large percentage of blow-outs, the uneven work produced, and the high cost of operation, it was decided to employ gas. Using this fuel not only produced cards that were better than those resulting from electrical heat, but a great saving in operating costs was realized. With the gas-fired machine, it was possible to secure a far greater variation of heating than was possible before. Further, with electricity it was necessary to have twelve machines in working order all the time; whereas with gas only seven were required. A two months' comparison made in connection with a New York plant before and after the conversion to gas shows a really large saving made in fuel costs alone, to say nothing of greatly increased production, &c.

BRITISH EMPIRE GAS EXHIBIT.

READERS who are visiting London this week to attend the annual meeting of the Institution of Gas Engineers, are, of course, arranging to include in their programme at least one inspection of the British Empire Gas Exhibit, in the Palace of Industry at Wembley. With the main features of the remarkable display to be seen there, they will already have made themselves familiar, by the aid of the detailed description that was given in the "JOURNAL" for May 13, and the various photographs which have since appeared in our pages; and the addition of the accompanying plan of the exhibit, with the explanation of the figuring, will make it perfectly "plain sailing" for them.



PLAN OF THE EXHIBIT.

1. } Allocated to Society of Women Journalists.
2. }
3. Store.
4. Office.
5. Demonstrator's kitchen, with geyser and gas cooker.
6. } Lobbies.
7. }
8. Committee room.
9. Cookery demonstration hall, with selection of cookers and hot water appliances placed on stands around the walls. On the demonstration platform are two eye-level cookers.
10. Model domestic kitchen, fitted with cooker, combined coke and gas boiler, and other labour-saving devices—including a low-pressure gas iron.
11. Laundry, with a big high-pressure iron for the ironing of large articles, and other high-pressure and low-pressure irons; also drying cabinet, and two coppers for the boiling of the articles washed.
12. Illustration of shop-window lighting, showing sulphate of ammonia and various bye-products.
13. Greenhouse, fitted with outside gas water heater for providing the heat necessary for the cultivation of flowers.
14. } Views of a room under varied conditions. In the first case the room is heated by gas, with the result that one observes a general appearance of cleanliness—the window revealing a clear and sunny atmosphere. The second view is of the same room heated by a coal fire grate, with the result that the appearance of the room is dirty, owing to the smoke of the coal fire and the dust from the cleaning of the grate and removal of the ashes. From the window is seen a smoke-laden atmosphere.
15. }
16. A 20 B.H.P. gas engine used for driving a dynamo for generating electricity for the working of the ventilation fans, and running of motors for compressors, &c. The special feature of this stand is the raising of steam by utilizing the exhaust gases from the engine.
17. } Fan chambers.
18. }
19. Main meter house.
20. Chauffeur's kitchen, lighted by gas, with gas cooking stove, gas copper, and coke fire.
21. Garage, lighted by safety gas lamps and gas radiator. There is a work bench, with brazing hearth and gas-heated soldering iron.
22. Hotel kitchen, illustrating the application of gas to large cooking requirements.
23. Fan chamber.
24. Cinema lounge.
25. Converted coal fire stand, showing old-pattern coal fire grates adapted to the fitting of modern gas fires.
26. "Hobbies"—work bench provided with gas-heated soldering-iron stove and glue pot.
27. Jewellery stand, with small enamelling furnace.
28. Pottery stand, having a gas-fired pottery furnace.
29. Ante-room, with handsome gas fire.
30. Children's nursery, lighted and heated by gas.
31. Bathroom, demonstrating lighting and water heating by gas.
32. Log cabin, showing various articles in the manufacture of which gas or its products play an important part.
33. Fruit bottling—boiling of fruit by the aid of a gas cooker.
34. South Africa—interior of room heated and lighted by gas.
35. Larder, demonstrating the making of ice by gas.
36. India—bathroom lighted and hot water supplied by gas.
37. Verandah, showing coloured fabrics illustrating dyes obtained from tar.
38. New Zealand—interior of room lighted and heated by gas.
39. Kitchenette, showing modern kitchen lighting, heating, and hot water furnished by gas. Every convenience in a small space.
40. Canada—interior of lounge hall, lighted and heated by gas.
41. }
42. } Pylons of fires of various finishes and designs.
43. }
44. } Inquiry counters.
45. }
46. } Stores.
47. }
48. } Empire food exhibit.
49. }
50. } Coke exhibit by the Gas Light and Coke Company.
51. }
52. Motor trades exhibit, showing various gas appliances used.
53. } Gas engines exhibit, showing 150 B.H.P. and 17-19 B.H.P. engines, and
54. } gas-heated wafer making machine.
55. }
56. } Industrial gas exhibit, displaying various types of furnaces for case
57. } hardening, metal melting, sugar boiling, pottery work, &c.

DISTINGUISHED VISITORS.

The Gas Exhibit has recently been honoured by the presence of some distinguished visitors. On Friday, May 28, their Royal Highnesses the Duke and Duchess of York spent a considerable time in this attractive portion of the Palace of Industry, and were greatly interested in the entire display made by the Gas Exhibit, which they regarded as an excellent one. They were particularly struck by the ice-making machine, which was in operation, demonstrating the making of ice by the application of gas. They also commented on the artistic display of lighting fittings, and the control switch, whereby gas is rendered as convenient as electricity.

This is what the "Daily Graphic" had to say on the subject: After lunching at the Garden Club, the Duke and Duchess of York spent the greater part of the afternoon going over the extensive Gas Exhibit in the Palace of Industry, where the Duchess was especially interested in the many domestic labour-saving appliances. In the Model Laundry a frock was being ironed by the giant "Gladiron," which weighs 90 lbs. The assistant had to explain to the Duchess every detail of its working by gas pressure operated by electric motor, the electricity for which is generated by gas. Another exhibit in which she was especially interested was the gas refrigerator. "Fancy making ice-cream by gas!" she exclaimed. "It does seem strange."

The Archbishop of Cape Town and Princess Beatrice visited the Exhibit on the following day, when the Archbishop said that the South African room was a very realistic representation. H.R.H. Princess Beatrice manifested a very lively interest in the display, and asked a number of questions which indicated her appreciation of domestic problems.

Other visitors have included Sheik Hamad bin Isa al Khalifah and his brother Sheik Abdulla, who, in their robes of black and gold and brown and red, with picturesque embroidery, proved keen inquirers after truth. Sheik Hamad placed an order for one of the ice-making machines just alluded to—explaining that he has recently started an ice-making factory in his dominions. A description of this novel little machine—the "Delaygue" refrigeration plant—was given in the "JOURNAL" three weeks ago [see p. 523]; and the appliance will probably find a place in many showrooms, for ice making by gas as a feature could be safely trusted to arouse keen curiosity and to lead to business.

These distinguished visitors from near and far are an illustration of the very real interest that is being displayed in an exhibit which has had praise bestowed upon it from all quarters.

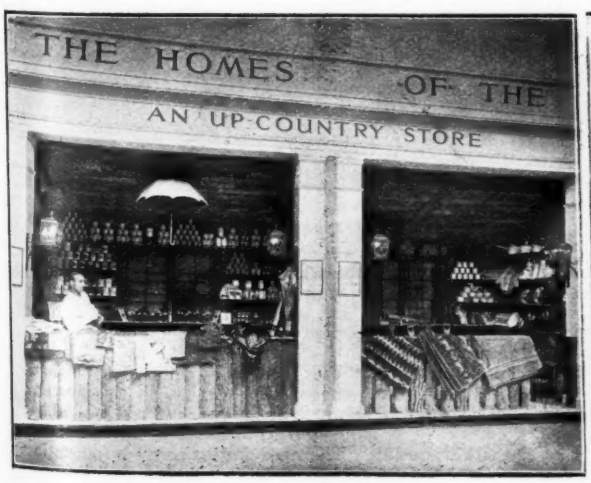
GAS IN JEWELLERY WORK.

The attention of those inspecting the Gas Exhibit may be drawn to a large glass case filled with handsome personal ornaments, into the fashioning of all of which gas has entered.

OUR PHOTOGRAPHS THIS WEEK.

We are able in this issue to add to our series of photographs.

BEDROOM-BOUDOIR IN THE NEW ZEALAND SECTION.



An Up-Country Store.

Gas Equipment for a Hotel Kitchen.

One would find it difficult to make a choice for tasteful arrangement from among the various Empire scenes; but in any such choice New Zealand would no doubt be in the front rank. It takes the form of a bedroom-boudoir, heated by a gas fire harmonizing with the period and decorations of the room, and lighted by gas brackets and table lamps. The next is a realistic reproduction of an up-country store, such as the pioneer depends upon in every Colony or Dominion. The contents of this store serve to illustrate the manifold resources and uses of gas in industry, as the whole of the stock consists of either bye-products of the gas industry—*i.e.*, disinfectants, drugs, fur preservatives, sheep-dip, &c.—or articles in the manufacture of which gas or one of the many bye-products of gas making is habitually used. The range of articles shown is enormous. Lastly there is portrayed modern gas equipment for a hotel kitchen—every item of which speaks for itself, and for efficiency, cleanliness, and the saving of labour.

HOUSING SECTION OF THE GAS EXHIBIT.

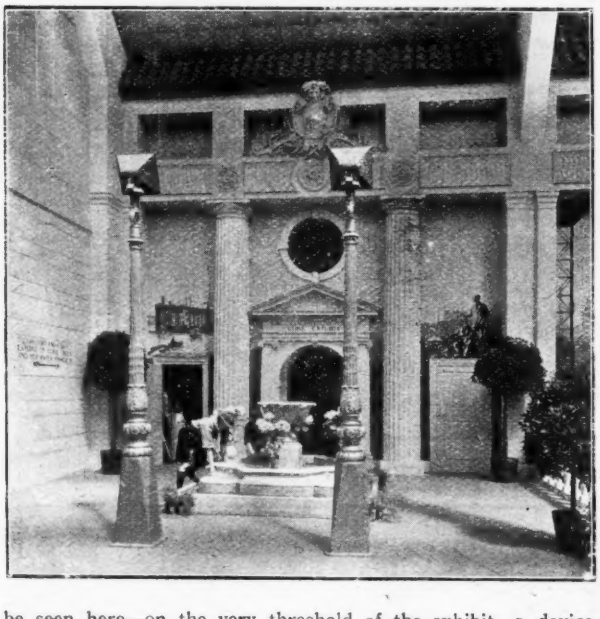
In the Palace of Housing, space is occupied by what is named the Housing Section of the British Empire Gas Exhibit.

Here is to be seen an appropriate display of cookers, fires, hot water apparatus of all types, gas irons, boiling rings, grills, hotplates, &c.—in fact, everything in the shape of gas equipment that is suitable for use in the home. The nearness of this display to the model houses will no doubt make it of substantial value as a "business getter," though nothing of an elaborate nature has been attempted here. The attention of the public is drawn to the fact that it is a supplementary stand, and they are invited to visit the main Gas Exhibit in the Palace of Industry. Two large boards tell the stories of (1) gas in the domestic field and (2) gas in the industrial field.

THE WEMBLEY COKE EXHIBIT.

Gas Light and Coke Company's Successful Demonstration.

Propaganda work of first-rate importance is represented by the excellent Coke Exhibit which has been undertaken by the Gas Light and Coke Company in a compact space adjoining (and communicating with) the British Empire Gas Exhibit. At first blush it might appear difficult to make anything with a "draw" in it out of a coke exhibit. Not at all. There is to



be seen here—on the very threshold of the exhibit—a device which will ensure for the display a steady stream of popularity. It was, indeed, a happy inspiration to fit up in this commanding position—outside the exhibit proper, and in the main gangway leading to the conference halls—a hot water fountain, giving a plentiful supply at 180° Fahr.; the end being thus successfully achieved of definitely associating coke with hot water. The hot water for this fountain is supplied by coke boilers in operation within the exhibit; and it makes an irresistible appeal to curiosity.

This curiosity once aroused, interest must inevitably grow; and the inquirer will enter what most nearly represents, perhaps, the big reception hall of a mansion. The exhibit has been designed by, and constructed under the instructions of, Mr. Walter Tapper, F.R.I.B.A., of No. 10, Melina Place, London, N.W.; and he has produced a delightful result within the small space at his disposal. In fact, one can fairly bestow upon it the highest praise, and say that it is fully worthy of the Gas Light and Coke Company, from whatever aspect it is viewed. It demonstrates effectively one basic fact to all and sundry—that there is no need to wait for a smokeless fuel; for such a fuel is already here, available for every purpose for which fuel is required.

FIRES AND BOILERS.

Three open coke fires will be found of special interest. The first shows an ordinary well grate, adapted on the principle advocated by Prof. C. V. Boys, F.R.S.—that is to say, all access to the underside of the fire is cut off. The fire burns on a blank firebrick hearth, demonstrating the fact that, instead of a strong draught being necessary, a coke fire burns brilliantly with a minimum amount of draught. Next there is an Eagle Range Company's hearth grate, which also has a firebrick bottom, but provision is made for the removal of fine ash into an ash-pan below. The third open fire is a "Florence" grate

made by the London Warming Company, which is provided with a back boiler, giving a plentiful supply of hot water.

Other exhibits include a model artizan's kitchen equipped with a "Sentry Minor" coke boiler and a gas cooker; while a radiator is connected-up, to demonstrate that an adjoining room can be heated from the same coke boiler. Another model kitchen is provided with a "Koke" boiler. This is a steel boiler, made by Messrs. Balmforth, of Luton. It has a long life, and is not liable to crack, though such failures among the cast-iron boilers so far are unknown. A model bathroom contains a wash-basin, towel rail, and magnificent bath.

Finally there is a selection of coke fired boilers which have been tested and proved by the London Coke Committee.

THE INDUSTRIAL SIDE.

In the industrial exhibit outlets for coke as a fuel are demonstrated mainly on the "Sandwich" system. There is a large-scale model of a modern water tube boiler, as used by the London County Council, and at other power stations, fitted with mechanical stokers adapted for coke and coal firing on this patent "Sandwich" system.

It may be recalled that the London County Council have recently purchased 45,000 tons of coke for use on this system. Deliveries of coke are to be made at the rate per week of about 1400 tons, equivalent to some 50 p.ct. of the total fuel consumption of the power station. The need for economy in operating the London County Council tramways is only too well known; and it is gratifying to note that, as a means to this economy, coke has been adopted for use in preference to crude coal.

Incidentally, this use of coke at important power stations—which include those of Marylebone and the London Electric Supply Corporation—illustrates a form of co-operation between the electricity supply and gas supply industries which is not only practicable but economical, as well as being in the national interest.

ROAD TAR AT WEMBLEY.

At the Sign of "The Jolly Tar."

Mention is made of the visit recently to the British Empire Gas Exhibit of Her Royal Highness Princess Beatrice and party; and also Sheik Hamad, with his brother Sheik Abdulla. On the same occasion both parties inspected the British Road Tar Exhibit of the National Gas Council in the Chemical Section of the Palace of Industry, and expressed keen pleasure at seeing so attractive a display. Her Royal Highness's exact words were "a very charming and useful exhibit."

Quite a lot of inquiries are being received at the stand; and they are not only from home sources. The President of one of the largest Paving Companies of America admitted the pleasure the exhibit had given him, and his appreciation of the information he had derived from it. An interesting feature is the number of what may be termed domestic inquiries—*i.e.*, in connection with garages, garden paths, &c.

TARRED ROADS AND FISH LIFE.

In another part of the Chemical Section of the Palace of Industry is a very ingenious working model which is attracting a deal of attention, and is understood to be exhibited by the South Metropolitan Gas Company. Water to imitate rain is continually running straight off three separate sections of tarred road into a pond in which numerous fish are swimming about.

The model is in the interests of "specially refined road tar, non-toxic for fish and plant life." It is pointed out that the "two periods when surface drainings from a road treated with ordinary tar are considered toxic to fish life are: (*a*) Immediately following the application of tar; and (*b*) when disintegration of the road surface occurs." In order to reproduce these conditions, one section of the roadway in the exhibit is re-treated periodically; the remaining sections being allowed to age normally.

GAS SUPPLIES AT WEMBLEY.

The use of gas at the Wembley Exhibition is still extending. We learn from the Brentford Gas Company that a large number of additional supplies have been put in.

The Chiswick Boot Polish Company are using gas for the necessary operations of melting and filling the tins with their "Cherry Blossom" boot polish. Steam is produced by means of a Briggs gas boiler; and this steam is carried round the vessels containing the polish, keeping it in a melted condition, and enabling the tins to be readily filled. The whole of the process of the Chiswick Boot Polish Company is of extreme interest to visitors to the Exhibition.

National Milk Publicity are also using gas in connection with their exhibit. It is employed for various purposes of pasteurization, &c., and their call has been for a 50-light meter. Virol, Ltd., are taking gas for the heating of the necessary urns for the provision of hot water and giving publicity to their product. The Express Dairy Company have also called for larger supplies. Messrs. Birds have now two "Regulus" cookers for exhibiting various special products of their manufacture. A supply of gas has been carried into the building used by Planters' Products, Ltd. This was formerly occupied by Messrs. Braby, and is entirely of metal construction. Bovril, Ltd., are using gas for boiling water.

The Canadian National Railway have asked for a supply of gas, as have Glaxo, Ltd., Pure Food Products, East Africa, Port of London Authority, Messrs. Lawrence & Parker, and Kenya Colony. Major Dugdale is using gas in connection with the rearing of chickens. Tea rooms have been fitted-up in Malaya, requiring the provision of a 50-light meter. Australia has considerably extended the use of gas, and an additional service has had to be laid.

The Brentford Gas Company inform us that their sales are satisfactory, and on some days have already been higher than they ever were during the British Empire Exhibition of 1924.

The South Australian Government have engaged Dr. Hyman Herman to investigate and report upon the possibilities of utilizing the brown coal deposits at Moorlands, South Australia. The lease of the land, formerly held by the Tailem Bend and Murray Coal Company, has now reverted to the Crown. An area of 73 miles has been reserved, and the Government have put down eighty-five boreholes. The average thickness of brown coal is 14·8 ft., and the average depth from the surface 79 ft. The total area so far proved by boring is 389 acres, and the brown coal available is estimated at over 8 million tons.

A PLEA FOR CO-OPERATION BETWEEN THE GAS INDUSTRY AND THE TRADER.

By F. CORNELIUS-WHEELER.

TIME was when the gas companies were almost the sole distributors of gas apparatus throughout the country, and rightly so, because the various undertakings made a scientific study of gaseous fuel, selected the right type of apparatus to use in varying circumstances, and devoted careful attention to safe and proper methods of installation.

During the last decade, conditions have somewhat changed, consequent on the enlightenment of the public regarding the advantages of gas for heating and cooking, due to the active and far-reaching propaganda advanced by the industry and the British Commercial Gas Association. The trade is perhaps in a greater degree realizing the possibilities of gas as a means by which household drudgery can be reduced to a minimum, thus adding to the comfort of the people by the elimination of unnecessary labour, dirt, and dust, and removing the cloud of smoke which enshrouds our bigger cities. Anything that can mitigate the smoke nuisance caused by burning coal in the open hearth, which is aggravated tenfold during foggy weather, deserves to receive the widest consideration.

If these facts are accepted, as on reflection they must be, surely the time is now ripe for closer co-operation between the gas industry and the traders, builders' merchants, and ironmongers, who handle all kinds of apparatus designed for domestic heating and cooking. The industry, in the past, has been inclined to regard the development and utilization of gas apparatus as a close preserve, due in a large measure to the inferior articles marketed by the trader, and to the inefficient, and sometimes dangerous, methods of fixing. This state of affairs has been still further induced by the fact that counting-house economies made the re-sale of reliable gas apparatus by the trader an unprofitable business. The trader, in consequence, unless he be a commercial philanthropist, could hardly be expected to push the sales of gas fires and cookers at the expense of coal grates and cooking ranges, from which he could anticipate deriving a reasonable rate of profit, and allow for overhead and establishment charges.

Until trading conditions are improved, merchants as a whole will be apathetic towards the re-sale of gas fires and cookers, and will devote their energies to pushing the sales of goods dependent on the use of coal.

A brief reference has been made to the faulty methods of fixing gas apparatus by those outside the industry, who sometimes appear woefully ignorant of the elementary principles governing the satisfactory use of gas. It may be argued that legislation should be framed to guard against the evils that may arise through ignorance or avarice; but until such time arrives, it is up to traders to recognize that the standard of workmanship employed by the gas undertaking is the only one that can give satisfaction to the user, and further the development of gas sales. Local co-operation must tend to ensure that the public (and they are the only people really concerned) receive reliable apparatus fixed in a manner conducive to safe, economic, and efficient usage.

As a nation we claim to be progressive; and nowhere is this more apparent than in the gas industry. Progress cannot be achieved by Acts of Parliament alone, but rather by the acts of individuals who successfully combine together to work for the benefit of the community. What eventually benefits the community, must in the end benefit the individual. No one, possibly excepting lawyers, sighs for fresh legislation; but a simple set of regulations dealing with suitable methods of carcassing buildings, running gas services, and fixing gas apparatus should be introduced into all Building Acts and borough and urban council bye-laws. Fatalities have occurred, and will continue to occur, where the fixing of gas appliances is allowed to be carried out by the unskilled, without effective regulations and proper supervision. The harmless but very necessary water pipes and fittings throughout a house are governed by drastic rules and regulations, and are subject to inspection and approval by competent authority. How much more necessary, therefore, that gas should be subject to a simple but efficient set of regulations to protect the consumer and generally to safeguard the industry.

Again, one is continually meeting cases where first-rate apparatus is not giving satisfaction to the user, solely because the piping is inadequate for the duty to be performed. The difference in the initial cost of (say) $\frac{3}{8}$-in. and $\frac{1}{2}$-in. pipe, or $\frac{3}{4}$-in. and 1-in. barrel, is almost negligible, but efficiency can only be attained by careful consideration of the sizes requisite. In all cases where gas is taken into a building, the sizes of piping determined upon should allow for additional apparatus, which is sure to follow if the first installation is carried out in a proper manner. A 50 p.ct. margin may not be too much to allow for future requirements. At the present time there are large numbers of so-called gas heaters, which are marketed for the

purpose of heating an apartment where no flue exists, and which, to ensure portability, are connected to a gas point by rubber rings and flexible tubing. Apparatus of this nature, though the gas consumption per hour is only about 4 or 5 c.ft., cannot be considered hygienic, and will be regarded with a great deal of suspicion by all who have the best interests of the gas industry at heart. It is against faulty installation and the choice of unsuitable apparatus, that the consumer, who is necessarily ignorant of these points, should receive some measure of protection; and future legislation will provide an efficient safeguard.

The housing question will for some years to come be one of the most pressing political problems. The builder of to-day is casting around to discover any methods which will tend to reduce building costs without militating against domestic confort. As a result of the active propaganda throughout the industry, it is becoming more and more recognized that gas provides an economical substitute for the coal grate where intermittent heating is required—such as in parlours, dining rooms, and bedrooms. Not only is gas a more economical fuel than coal for occasional use, but the builder is ready to appreciate the fact that considerable structural and financial savings can be effected by the elimination of ordinary coal-fire construction, and the substitution of narrow flues contained in the thickness of the external or cross walls. This system eliminates the large projecting chimney-breast incidental to the coal flue, thus giving a greater floor area—an important point where the sizes of rooms have to be cut-down to a minimum, owing to the present-day cost of building. These new and beneficial methods of flue construction have received the official approval of the Ministry of Health, the London County Council, and other public bodies.

It is not the writer's intention in these few remarks to offer any suggestions as to the best method of obtaining closer co-operation between the gas industry and the trader, builders' merchant, ironmonger, and builder, because this must be governed in a large measure by local conditions; but if it to some degree ventilates a subject on which many highly-qualified writers can express their opinions, the air would be cleared, and a spirit of mutual co-operation would be created, which would help to sound the knell of the coal grate, and improve generally the conditions under which we live.

RECOVERY OF PHENOL FROM EFFLUENTS.

Herr Peter Franke, of Essen, in "Das Gas und Wasserfach" for April 18, dealt with various methods of extracting phenol from the effluents of gas-works, coke-ovens, &c., with a view to eliminating the harm which it does to fisheries and agriculture. Of numerous processes which have been tried, he selected for mention only those which have been commercially proved, in which the costs are covered by the value of the phenol recovered, or even a profit is shown.

In dealing with considerable quantities of effluents, the separation of the phenol is based upon its solubility in benzole, its homologues, or trichlorethylene. An intimate mixture of the liquor containing the phenol with the solvent is essential, and the subsequent separation of the liquids is easy in view of the different specific gravities. The separation of the phenol from the benzole solution is effected by precipitation with caustic soda, or by heat.

Recovery from Alkaline Liquors.

In fig. 1 is shown an arrangement suitable for use in connection with the ammonia plant of a bye-product works. In

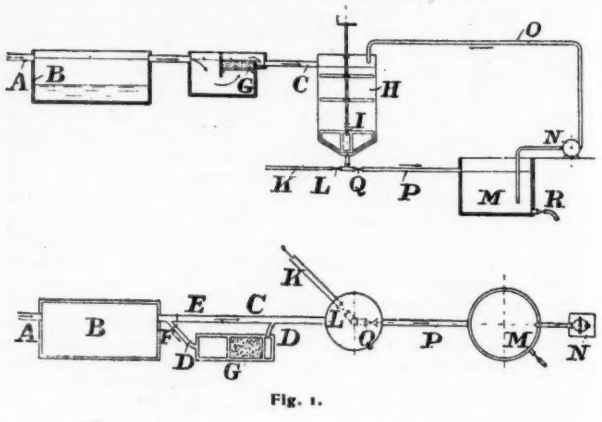


Fig. 1.

such a case it is necessary first to acidify the liquor to be treated, and, for this, waste resinous products are generally available. The waste liquor arrives by *a* into the settling basin *b*, in which solids, such as lime sludge, are deposited. The greater portion of the clear liquor flows through the pipe *c*, while a smaller part is trapped by the connection *d*. The quantity of the latter is regulated by the valves *e* and *f*, and it flows through the filter *g*, which contains the acid resins, from which it takes up sufficient acids to neutralize the main stream in *c*. The liquor, thus neutralized, reaches the washing and mixing apparatus *h*, which is provided with a stirring arrangement *i*. The washer is half full of benzole, and is filled up with the liquor, and the inlet then closed. By stirring for several minutes, an intimate mixture is effected, and the liquor subsequently separates-out at the bottom, while the benzole, which has dissolved the phenol out of it, remains on top. The latter stays in the washer, while the waste liquor is run-off through the pipe *k*.

From the collecting tank *m*, sodium hydroxide is raised, by means of a pump *n*, and by way of *o*, to the washer *h*. Here a quantity equal to that of the waste liquor treated is stirred for a few minutes with the benzole. The latter, thus freed from phenol, again separates-out on top, and the sodium hydroxide is run-off into the tank *m*, by way of the cock *q* and the pipe *p*. Part of the sodium hydroxide combines each time as sodium phenate; and, when this process is sufficiently advanced, the contents of *m* are run-off at *r*, and more sodium hydroxide is introduced. The sodium phenate can be disposed of to the chemical industry, and the only loss of benzole is due to any evaporation there may be, and any slight traces of solubility in water.

In order to save the slight cost of acidifying the waste liquor, it is suggested that the process may sometimes be applied to the ammoniacal liquor itself before this has been treated. In this way, also, considerably more phenol can be recovered.

Recovery as Crude Oil by Distillation.

The apparatus sketched in fig. 2 consists essentially of a distillation vat and several washing compartments, arranged

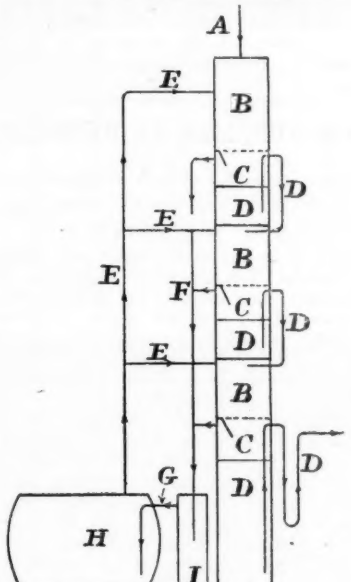


Fig. 2.

A. Liquor inlet.
B. Wood shavings.
C. Benzole.
D. Liquor.
E. Benzole vapours.
F. Phenol-benzole outlet.
G. Phenol-benzole overflow.
H. Distillation vat.
I. Separation tank.
J. Liquor outlet.

one above the other, with phenol separators. Each is divided into two spaces, the upper being filled with wood chips or other material, in which the benzole vapours come into contact with the liquor containing phenol, and the lower being that in which the liquor and the benzole separate from one another. The plant includes also a collecting separation tank, where any liquor which has gone through with the benzole can finally settle.

The liquor enters first into the top chamber, and comes into contact with the benzole vapours, which absorb the phenol. In the lower compartment, the benzole-phenol solution and the liquor separate, owing to their different specific gravities. The former runs-off by the central pipe to the collecting separation tank, while the liquor, still containing some phenol, runs into the second chamber, where the process is repeated. After passing the third chamber in the same way, the liquor is as good as cleared of phenol, and can be disposed of direct from here; and any of it that has passed over with the benzole to the collecting

tank will separate out there, and can be run-off at the bottom for disposal. The benzole-phenol solution passes by an overflow into the distillation vat, where the benzole is vaporized and returns to the process, while crude phenol oil only remains.

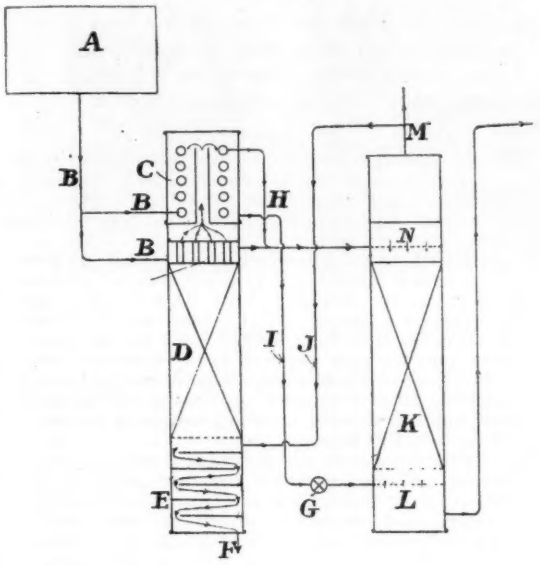


Fig. 3.

A. Elevated tank.
B. Liquor.
C. Condenser.
D. Packing with Raschig rings.
E. Distilling plant.
F. Phenol outlet.
G. Benzole pump.
H. Preheated liquor.
I. Benzole (fluid).
J. Phenol-benzole.
K. Mixer filled with Raschig rings.
L. Benzole inlet.
M. Ventilation.
N. Liquor inlet.

A Liquid Benzole Process.

Fig. 3 indicates the apparatus for a combined liquid and vapour process. The separation of the phenol from the benzole is done by heating, while the benzole is introduced to the liquor in liquid form. Before being mixed with the benzole, the liquor flows down from a high storage tank through a condenser and a dephlegmator. In this way it is warmed for the process of phenol extraction, which is thus expedited. By means of a pump, the benzole is introduced at the lower end of a mixing tank, which is fitted with Raschig rings or other packing, while the liquor enters at the top. With its lower specific gravity, the benzole rises, and the liquor moves in the opposite direction. Working in this way, a very efficient result is achieved, especially as the fresh benzole entering the mixer first comes into contact with the liquor when the latter has already given up most of its phenol.

The benzole, after taking-up the phenol, passes into a distillation apparatus, where it is vaporized, and from which the crude phenol oil is run off. The benzole vapour then passes through a space filled with Raschig rings, and a dephlegmator, where any remaining particles of phenol are retained. It is then condensed, and returned to the process.

Trichlorethylene.

The use of trichlorethylene, either in liquid or vaporous state, has the advantage over benzole and its homologues that it is not highly inflammable, and is not even slightly soluble in water, so that not even slight traces are lost in this way in the process. In coke-oven works, however, no doubt the benzole produced locally will be preferred. It has also been found on occasions that trichlorethylene in mixture with water gives rise to corrosive troubles, due to formation of free hydrochloric acid.

Payability.

The author estimates the payability of the processes on the basis of treating liquor containing 0·5 p.ct. of phenol. With a 90 p.ct. efficiency, 45 lbs. of crude phenol oil are recovered from 1000 gallons of effluent, requiring the vaporization of 300 gallons of benzole by about 0·27 ton of steam. On these figures, he considers the process quite profitable, having due regard to cost of wages, depreciation, &c., and that, far from being an added charge, it improves the showing of the bye-product plant.

INDUSTRY AND SMOKE ABATEMENT.

At the Annual Conference of the Royal Institute of Public Health, which was held at Brighton last week, Mrs. M. A. Cloudesley Brereton, in collaboration with Mr. Ian Macdonald Horobin, M.A. (Hon. Warden, Mansfield House, University Settlement), read a paper entitled "Industry and Smoke Abatement."

Industrial Smoke: The Next Step.

My view, says Mrs. Cloudesley Brereton, is that we cannot tackle the domestic smoke problem in any but a very gradual way. We can only concentrate on educational propaganda about smoke; leave the gas and electric industries to go on winning public favour; enlist the intelligent co-operation not only of doctors, but of architects and builders; and wait upon Science to solve the problems of large-scale production of a cheap free-burning smokeless solid fuel. Because we have to wait in this, does it follow that we should also wait to tackle industrial smoke, for which in many cases remedies are to hand? I think not. But let us, whatever we do, avoid making industry hostile to appeals for reform, by being deaf ourselves to the reasonable appeals of industry for caution.

Lord Newton's Smoke Abatement Committee drew a perfectly sound distinction between smoke from boiler furnaces and smoke from other manufacturing processes. Well over half the industrial smoke comes from the former source, and generally speaking this may be dealt with as a single problem, irrespective of the industry in which the steam-raising plant is used. It is not possible, however, to fix a definite limit to the amount of density of smoke permitted from boiler furnaces, which should be universally applicable, since the type of the existing plant, and the size and constancy of load, variously affect the possibilities of smoke prevention. Such measures as were contemplated in recent Smoke Abatement Bills are, therefore, the best that can be reasonably imposed—measures whereby an emission which "constitutes a nuisance" shall not entail a fine if the manufacturer is able to show "that he has used the best practicable means for preventing the nuisance, having regard to the cost and to local conditions and circumstances."

It might be profitable for the Minister of Health to invite the opinion of industries on a proposal to set a time limit to the operation of such regulations, after which they would be replaced by a definite and stringent standard of maximum smoke emission permissible from boiler plants, irrespective of cost and local conditions and circumstances. In other words, those firms whose boiler plants are at present not capable of preventing smoke as effectively as others would be given a definite period of so many years in which to adopt new plant, new methods, or special devices for the prevention of smoke.

I do not pretend to know how such a suggestion would be received by industry. My main point, indeed, is not to recommend that such measures should be taken, but that industry should be invited to co-operate with the Minister in offering advice as to what is and what is not practicable. The Ministry of Health is, I believe, alive to the necessity for consulting industry. I only stress the point because some zealous reformers are not. And such zealous reformers do harm.

The same principle of taking the views of industry is even more applicable to smoke from manufacturing processes other than steam raising. I would suggest:

(1) That the Minister of Health should appoint permanent committees composed of leading progressive manufacturers in individual industries (or groups of industries which can fairly be treated together) to advise him as to the minimum of smoke which it is practicable to emit by employment of efficient methods in reasonably up-to-date plant in the processes concerned.

(2) That a fuel expert of recognized standing be included, besides business men, on all such committees.

(3) That the minimum smoke emission practicable, as defined by these committees, should be scheduled by the Minister as maximum standards of permissible smoke emission.

(4) That legislation be enacted making it obligatory upon local smoke authorities, having power over larger areas than those responsible at present, to prosecute when these maximum standards of smoke emission are exceeded.

(5) That, as suggested in recent Bills, it should be a defence to show that the best practicable means had been taken to prevent emission of smoke in excess of the standards.

(6) That, for the benefit of manufacturers and the guidance of judges in prosecutions, the committees should be invited to draw-up instructions to show by what methods it is practicable to reduce smoke to the standards set up on their recommendation.

The spirit of this recommendation is, I am sure, a right one.

(7) That the Minister should further allow and encourage local authorities, in consultation with the local chambers of commerce, to set-up local committees representative of industry in their area; and that the principal functions of these committees should be to encourage local *voluntary* standards higher and more exacting than the national standards set-up by the Minister on the recommendation of the national committees.

If the problem of industrial smoke is approached along such lines, effective legislation should be practicable—not legislation that would impose new burdens upon industry at this unfitting moment, but legislation of a kind positively helpful to industrial progress.

SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

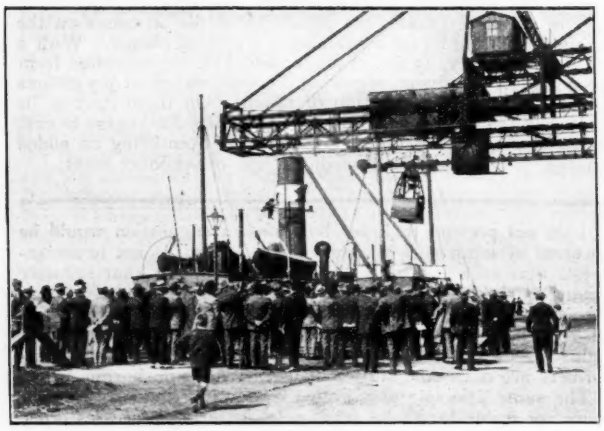
THE BOURNEMOUTH GAS AND WATER COMPANY.

THE Summer Meeting of the Southern Association took place in Bournemouth last Friday, when a large number of members assembled to enjoy the hospitality of the Bournemouth Gas and Water Company, and to visit the works of their President, Mr. P. G. G. Moon, F.C.S. Perfect weather favoured the occasion, the hospitality was of a most generous order, and keen interest was taken in the bold construction work at Pitwines, Poole.

The rendezvous was the Square, at 10 a.m., whence the party were conveyed in motor coaches to Poole, traversing the Pitwines site and disembarking on the quay where coal is unloaded for the old works. It will be remembered that the Bournemouth Company acquired the undertaking of the Poole Gas and Coke Company in 1902, and in 1905 extended the harbour site to 3¼ acres.

THE WORKS.

The coal is unloaded by two bridge transporters. The original one, which was supplied by the Temperley Transporter Co. (now amalgamated with Sir Wm. Arrol & Co.) has a nominal capacity of 50 tons per hour, and has worked continuously since it was first erected in 1905. The operator sits in a fixed cabin, the grab being controlled and travelled by wire ropes. The second transporter was supplied by the Mitchell Conveyor Co. in 1922, and has a capacity of 100 tons per hour. It operates on a rather different principle, as the driver, instead of being in a fixed cabin, travels with the grab,



Mitchell Transporter at Work.

and thus has better control over the operations of the crane, while a further advantage is that the wire ropes required are much shorter than with the Temperley transporter.

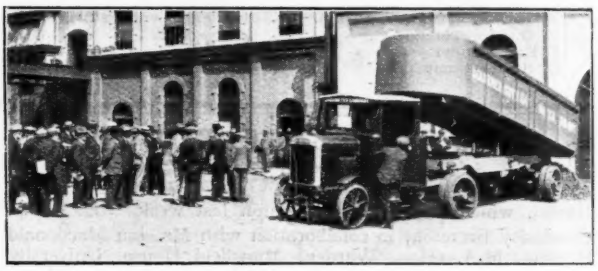
The transporters have a span of 180 ft. over the coal store, and a cantilever span, over the public road and two railway lines, of 116 ft. They travel transversely across the coal storage ground and enable coal to be dumped upon and picked up from every portion of the area. The coal is lifted from the hold of the ship by means of grabs; and when both machines are working, a vessel can be unloaded in 10 hours, including all stoppages for greasing, trimming, &c. The transporters can deliver coal either from the ship or from the stock heap through the coal breakers and fillers to the gravity-bucket conveyors which convey it to the overhead bunkers in the retort houses.

The carbonizing plant consists of: (*a*) One house containing 100 23 in. by 16 in. by 21 ft. through retorts, equipped with De Brouwer charging and discharging machines. The capacity is 1½ million c.ft. per day. The coke is removed by a hot coke chain conveyor, and stored in ferro-concrete hoppers with a capacity of 280 tons. (*b*) Two houses containing three benches of Woodall-Duckham verticals, each bench having 24 retorts, 25 ft. long. The capacity of each bench is 1¼ million c.ft. per day. Two Bonecourt waste-heat boilers have been installed, with a capacity of 4200 lbs. of steam per hour.

The coke is brought from the vertical retort houses by gravity-bucket conveyors encircling the benches, and is screened and graded before being dumped into the storage hoppers. These have a capacity of 450 tons, making with the horizontal hoppers a total storage of 730 tons.

To deal with the coke required by the water gas plant and boilers, there is a Mitchell 3-ton radial cantilever crane with a radius of 70 ft. and a height of lift of 45 ft. The operating cabin of this crane travels with the load, and thus control is very much easier than from a fixed cabin on the framework. The crane puts the coke required by the water gas plant and boilers direct into overhead storage hoppers serving these plants, deals with the ashes from the retort houses, boilers, and water gas plant, and will also feed a loading station on the new cableway conveyor to Pitwines.

The coal handling plant and the radial crane are of outstanding interest, and received much comment from the visitors. Their attention was next called to a Scammell "Six-Wheeler" motor trailer, which ran quietly into the yard and with the minimum of fuss deposited its heavy load of coke in a neat stack on the ground. The trailer frame of this machine carries a long pressed-steel body mounted in trunnions at the rear; and the load is tipped by raising the body on the piston-rods of hydraulic

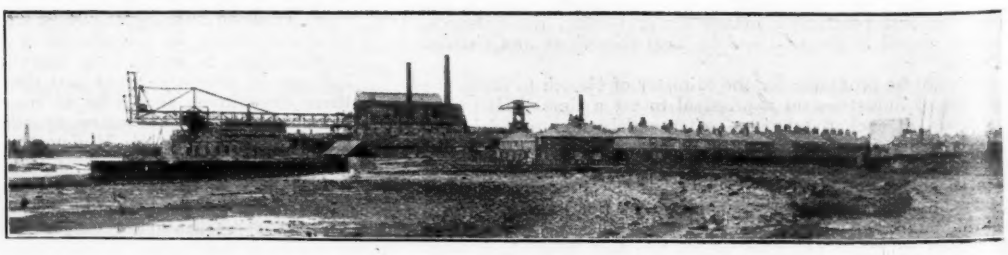


Scammell "Six-Wheeler" Unloading.

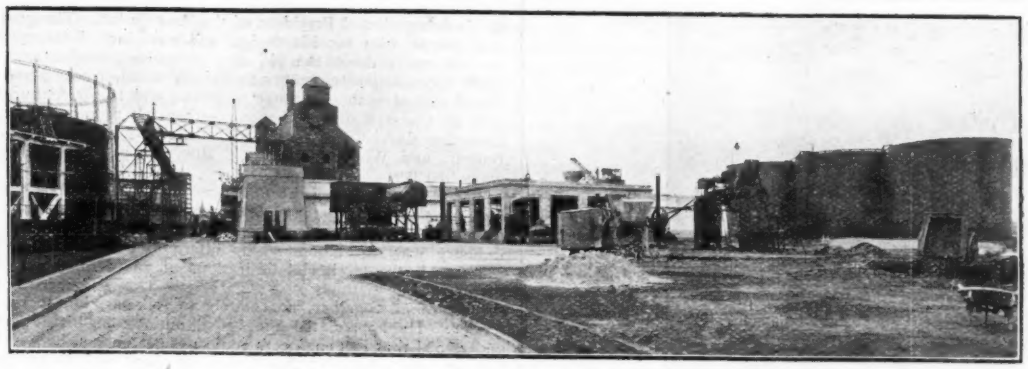
or oil-pressure cylinders, the power for which is developed by the motor engine through a suitable clutch and gearing. The "Six-Wheeler" has a capacity of 10 tons, and is used by the Bournemouth Company for transporting coal or coke to the Bourne Valley Station or the water-works.

An adjournment was soon made, by way of the new ropeway passage, to the Pitwines site, where the progressive policy of the Directorate and the ingenuity of their Engineer and the contractors are rapidly bringing to completion one of the finest gas-making stations in the country—on a site largely reclaimed from the sea for harbour works. Col. Harold Woodall, when Engineer to the Company, built the 2¾ million holder on the only clay he could find; and the piling which has been carried out to make extensive works possible on the site was a task requiring great skill and patience. Full details of this, as of the design of all the new plant, were included in the supplement which Mr. Moon gave to his Presidential Address at the Annual General Meeting on March 24 [see *ante* p. 117].

Large-scale drawings were posted up by every section of the plant, and the visitors were ably guided and fully informed on any matter by members of the Directorate, Mr. Moon, and his assistants and staff, who are to be cordially thanked for their services. Time was too short, however, for a thorough inspection of the many features; and it is hoped that an opportunity will one day be granted for another visit when the station is at work.



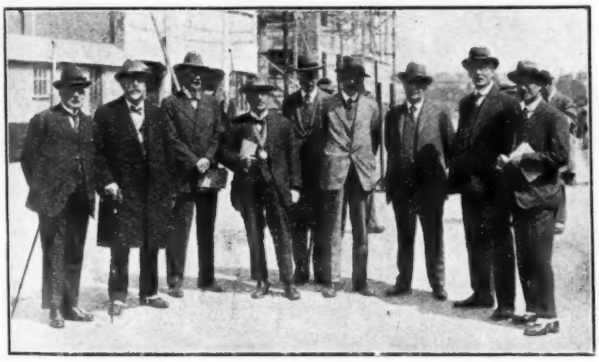
The Poole Works on the Left; the Pitwines Works on the Right.



PITWINES—NORTH-EAST ASPECT,
Showing the 15,000-ton coal store, the ropeway terminus, and the Woodall-Duckham verticals.

The 15,000-ton coal store, with its conveyor on a travelling gantry, was first viewed. At one corner the shuttering for the concrete of the terminal station of the cableway was in position. Here, automatic devices will tip the buckets into one of three hoppers—for coal, coke, or ashes. Next for inspection came the Woodall-Duckham verticals—capacity, over 2¾ million c.ft. a day. A new setting, not yet fired, offers the fullest opportunity for the examination of details of construction and mechanism; and the majority of the visitors made a tour of each stage, and on the charging level had the advantage of explanations of the latest developments from Sir Arthur Duckham himself. A new feature at ground level is extraction of the ashes from the hanging-bar producer grates by gear similar to that for coke extraction from the retorts.

One two-million Humphreys & Glasgow C.W.G. plant is in course of erection at the end of the main block of buildings. The "house" is very spacious, and it is probable that in due course the water gas plant from the Poole Station will be shifted into it. Automatic chargers and self-clinkering grates



LEFT TO RIGHT: Mr. Plumb, The Mayor of Bournemouth, Lt. Col. H. W. Woodall, The Mayor of Christchurch, Sir Charles Jessel, The Mayor of Poole, Mr. E. Honoratus Lloyd, Sir Charles Morgan, Mr. P. G. G. Moon.

will be applied to the new units. The boiler house is adjacent; and the ash shaft between this and the C.W.G. house excited considerable comment. Alongside the boilers are the Dowson suction producers which supply the power house, so that the solid fuel using plants are grouped together.

The power and exhauster house is an admirable piece of work; and fortunately the engines were seen running—on town gas for the present. They form part of a large Keighley Gas Engine Company contract for producers, engines, dynamos, compressors, and auxiliaries, and are of the latest pattern with gas and water supply below ground level and visible cooling water feed. Two generating sets are complete, and the power section of the house has been designed for two more, besides the auxiliary plant. The main switchboard is not yet in place. The exhausters—three out of six by G. Waller & Sons, each of 125,000 c.ft. per hour, are installed at present—are on a platform nearly the full length of the house, and about one-third its total width. Three lines of mains are readily accessible between the platform and floor level. Over the power units runs a 2½-ton crane, and over the exhausters one of 1 ton capacity; and it was pointed out that a gap, which will be screened, has been left in the dividing wall between this house and the adjacent workshops. This opening is big enough to pass the largest single part of the power plant.

In these few notes an endeavour has been made to record the features which specially attracted attention, for the whole scheme was admirably dealt with by the President in his address.

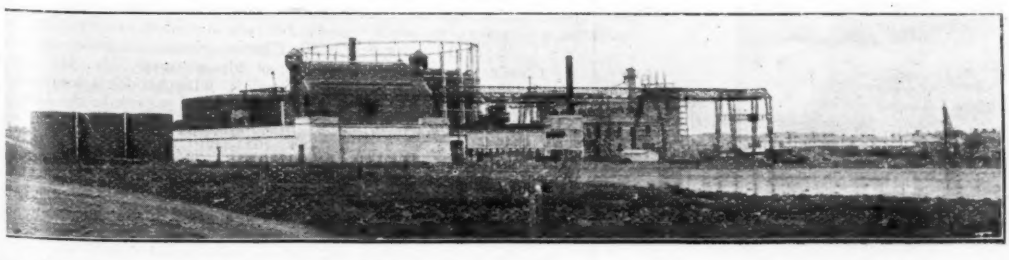
THE LUNCHEON.

Light refreshments having been served, the visitors made their way past the booster and purifier houses to the main entrance of the new site, where the motor coaches were waiting to convey them to the Branksome Towers Hotel. Here they were the guests at luncheon of the Chairman and Directors of the Bournemouth Gas and Water Company.

Mr. William Cash, F.C.A., was in the chair, supported by Sir Charles Morgan, C.B.E., M.Inst.C.E., Sir Charles J. Jessel, Bart., Col. H. Woodall, C.I.E., M.Inst.C.E., and Mr. E. Honoratus Lloyd, Directors of the Company. With them at the top table were their Worships the Mayors of Bournemouth, Poole, and Christchurch; the President of the Association, the Vice-President (Mr. R. Robertson, of Bristol), and the Secretary (Mr. H. C. Smith, of Tottenham); and Sir Arthur Duckham, K.C.B., Mr. Thomas Hardie (Chief Engineer of the Gas Light and Coke Company), and Mr. W. M. Mason (Manager of the "B.C.G.A."). The following were unfortunately prevented from attending: Mr. J. Ferguson Bell, the Presidents of the North British and Midland Associations, Dr. Lewis Bailey (Chief Inspector of Alkali Works), Mr. F. Napier Sutton, and Mr. W. B. Leech (Engineer of the Beckton Station). The Loyal Toast was honoured at the call of the Chairman.

POINTS FROM THE SPEECHES.

The CHAIRMAN proposed "The Southern District Association of Gas Engineers and Managers." To them he extended a hearty welcome to Bournemouth, and on behalf of the assembled company voiced appreciation of the presence of the Mayors of Bournemouth, Poole, and Christchurch. Nowadays the gas engineer had to be a man of high efficiency and training. Besides gas-making, his duties demanded a knowledge of all branches of mechanical and constructional engineering, and of chemistry and electricity. On the administrative side he had to deal not only with his men but with the consumers; and commercial training was necessary for buying and selling such things as coke, sulphate of ammonia, and tar. Added to this at Bournemouth was water engineering, with its many problems. He sometimes wondered the Engineer did not get confused, fill his holders with water, put his gas through sand filters, soften the gas, and attempt to purify the water with oxide. [Laughter.] These Association meetings gave opportunities for the exchange of ideas and the examination of new processes. He had been interested to note that Mr. Moon had touched on several processes of purification, oil cracking, &c., in his presidential address. With the toast he coupled the name of Mr. Moon. The Directors were highly gratified



and the Intervening Streets through which the Ropeway Conveyor will run.

THE LUNCHEON PARTY ENTERTAINED AT THE BRANKSOME TOWERS HOTEL.

at his being elected President of the Association. The greatest credit was due to him for his design and planning of the new works—carried out without the aid of a consulting engineer. Mr. Cash made appreciative references to Col. Woodall, whose presence on the Board was of such advantage to them; and to Sir Arthur Duckham, once on the staff of the Company—they felt proud that he was with them that day. They were proud, too, that the Engineers of Croydon, Barnet, and Worthing were old Bournemouth men. They had always had first-class officers.

The PRESIDENT replied. On behalf of the Southern Association he thanked the Chairman and Directors for their great hospitality. In his opinion these meetings were able to be of value because the gas industry was not hampered by internal competition, and what he might call the territorial limitations of gas companies allowed free discussion on methods and efficiencies. Gas engineers realized that they were all together, not merely to sell gas, but to render public service. He appreciated the broad outlook of his Directors, who understood that gas engineers could not get on just by watching their holders go up, but that they had to go about and discuss things elsewhere.

Mr. R. ROBERTSON, of Bristol (Vice-President of the Association), gave the toast of "The Local Boroughs;" and, incidentally, amused the company. On their busman's holiday, he said, they had been trying to find the secret of success which attended the Bournemouth undertaking; and he thought they should put the Bournemouth Company on to show the electricity industry how to develop their business without a subsidy. In eulogizing the boroughs of Bournemouth, Christchurch, and Poole, he found a point of similarity between the latter two—at Christchurch the Priory, at Poole the gas-works! Both were responsible for the dissemination of light; and, if he might say so, both had something to do with heat—one showed how to produce it, the other how to avoid it.

Their Worships the MAYORS responded; the Mayor of Bournemouth congratulating the Company upon their enterprise. In his younger days the site of the Pitwines Works was nothing but harbour mud. His Worship of Christchurch remarked that a few years ago they had had the good sense to change from electricity to gas, and they had no reason to complain. The Mayor of Poole said that the Company provided one of the links between the boroughs. Poole had fine opportunities for expansion, and one day it might be a larger consumer of gas than Bournemouth.

The Chairman with Engineers of Companies in which he is Interested.

LEFT TO RIGHT: Mr. P. G. G. Moon, Mr. S. O. Stephenson (Worthing), Mr. Wm. Cash, Mr. W. J. Sandeman (Croydon), Mr. A. Caddick (Croydon), Mr. Hasledine (Barnet).

Sir ARTHUR DUCKHAM, K.C.B., proposed "The Bournemouth Gas and Water Company." As an old Bournemouth man, it gave him great pleasure to give the health of the Company; and he was delighted to see present two of his old chiefs—Col. Harold Woodall and Mr. T. S. F. Gibson. He considered that the Bournemouth Company had done more than any other for the progress of the industry. Two points of their policy especially struck him. The first was that they had led the way in establishing the new relationship between gas companies and their consumers, which had at one time been very different from what it was now. The second point was that they had always shown great courage and a wealth of ideas. He felt sure that Mr. Moon would have one of the finest works in the country.

Mr. WILLIAM CASH responded for the Company. Kind things had been said about the Board of Directors, which, he confessed, comprised experts in almost every relevant direction. In this regard Mr. Cash mentioned specially Sir Charles Morgan, a great engineer, Sir Charles Jessel, financier and gas administrator, Mr. Honoratus Lloyd, K.C., and Col. Harold Woodall, with his local knowledge. The Company's great problem was to meet the growth in the demand for gas. In 1894, their output was 208 million c.ft.; in 1904, 527 millions; in 1914, 1016 millions; in 1924, 1791 millions. In 1904 they had 14,149 consumers, and in 1924 36,362. The charge on the capital was, at present, no more than pre-war. After mentioning the Company's co-partnership scheme and their service of the consumer, Mr. Cash concluded with a reference to the charms of Bournemouth and the adjacent boroughs.

Mr. MOON, at the close of luncheon, announced that in the course of the afternoon's drive they would pass the Swanage Gas and Elec-

tricity Works—an excellent example of the joint supply of the two commodities. He pointed out that since the inception of joint working there had been an increase of 117 p.ct. in the consumption of electricity, and at the same time an increase in gas consumption.

The band of the Bournemouth Gas and Water Company played, on the lawn of the hotel, an excellent programme of music during and after luncheon; and a photograph of the party was taken before leaving for the drive. The latter, in the perfect summer weather which favoured the visit, was to Swanage, and led by Corfe Castle and through a countryside full of natural features of interest.

It is needless to say that the visit was greatly enjoyed by all present, and that many thanks are due to the Bournemouth Gas and Water Company, to Mr. Moon, Mr. Smith, and all who worked to make it a success; and the large attendance of members and visitors must have been gratifying to the hosts, especially in view of the visit's immediate proximity to "Institution Week."

CALORIFIC VALUE AND GAS TESTING.

By NORTON H. HUMPHRYS.

The observations under this heading (see *ante*, p. 528) comprise items with which all who have had practical experience in manufacturing and supplying gas subject to the provisions of the Gas Regulation Act are likely cordially to agree; but also some that may be regarded as of doubtful character. Objection will not be made to the soundness of a proposition that the gas sent out from any one works should be uniform in calorific value and specific gravity (to which the supply pressure at the inlet of the consumer's meter might be added), or to the inadequacy of official tests, no doubt correctly conducted, but so far apart that they fail to indicate a fair average, and may consequently tell against uniformity. At an early stage of experience in carrying-out the requirements of the 1920 Act, on a small works where the official visits were limited to four per annum, the fact was evident that the official annual average might differ by as much as ten units from the average of the works bi-weekly tests, a sufficient margin to cause undeserved stigma of liability to penalty; and that, under such conditions, the costly and cumbersome official calorimeter set is a white elephant, so far as official use is concerned. That it will be a great acquisition to an intelligent and energetic manager is another story. Better and more satisfactory results could be secured by the weekly or bi-weekly use of a simple, self-contained, and portable direct-reading apparatus that could be operated by any intelligent lad, of which appliances several varieties, claimed to be accurate within 2 p.ct., are now on the market. The average of the daily readings obtained from an instrument of this class is at least as near the mark as the official four-item annual average.

Where is the need for a costly and elaborate set of apparatus, if the operation procedure is such that the results obtained by it are not within 2 p.ct. of a correct presentment?

As a means of securing information respecting the extent of amplitude between maxima and minima, also as affording a portable and comprehensive record covering a period of years, which may be placed on view in the office or board-room, the graph illustrated on page 529 can be highly recommended. Weekly readings are readily included on a sheet of moderate dimensions, covering the entire year's operations; and three or more years may be shown on the same chart, by the use of different coloured inks. The facility for comparison is far greater than can be afforded by paged record, and a useful addition is a blank space at the foot, for entry of averages, coal used, and other details.

According to personal experience, a jump of 40 B.Th.U. or more between the quality one day and the next is both undesirable and avoidable. I have never met the obsequious consumer who takes off his hat and expresses polite gratitude for a reduction of 100 B.Th.U. or so in the quality of his gas supply; but have reason to believe that fluctuations extending to 40 B.Th.U. or more create dissatisfaction that is none the less real if not definitely stated to the clerk at the complaint counter or to the meter inspector. Many consumers have an innate dislike of making complaint, or believe the same to be useless, but they are impressed with the difficulty as an inherent and unavoidable defect peculiar to town gas, and business is thus prejudiced.

In exceptional circumstances, an undertaking "under excellent management" may be compelled to supply some 30 B.Th.U. below the declared value for a sufficient time to necessitate a corresponding swing of the pendulum in the other direction in order to recover the average. But that such is a fair generalization as applied to everyday practice throughout the country, I do not believe; having found that an output of 25 million c.ft. per annum can be comfortably worked, year in, year out, within a 25 B.Th.U. margin, which, as experience accumulates, will doubtless be reduced. The facilities for uniformity increase with the scale of operation. Any engineer, excellent or otherwise, who exceeds 20 to 25 B.Th.U. may be advised to give full attention to the causes of variation.

There is room for wide differences of opinion respecting the need for, or the advantages obtainable by, the adoption of one compulsory standard of calorific value throughout the country. Its advocates occupy an ambiguous position. Some seem to regard it as a new thing, forgetting that the gas industry had settled down for at least 25 years prior to 1920 to a uniform 14 candle (No. 2 "Metropolitan" burner) illuminating power, and that a national standard has thus been afforded a prolonged trial. For various reasons some exceptions existed, but the extent to which the 14 candle standard was adopted amply sufficed to illustrate the advantages or defects inherent in one fixed standard. Among other things, a leading feature in the Gas Regulation Act, 1920, is an advance on the uniform quality, in response to complaints as to the limitations thereby involved, in the way of free selection of materials and processes, towards giving the consumer the best possible value at the least cost. With continual increase both in extent and variety of the available materials and processes, this objection is not less important in 1925 than 1919. The 14 candle quality was arraigned both at the works and on the district. The works manager had one hand tied behind him; and 14 candle was not necessarily the best for the consumer. The Act introduced full liberty in respect of both these matters, not only at the start, but for alteration, if thought desirable, at reasonable intervals. Up to the present, undertakings coming under the 1920 Act have followed the line of least resistance, for the greater part, and continued to work without important alteration to existing practice, not accepting a declared value that varies from 14 candle (considered to be equivalent to 500 B.Th.U.) by more than 10 p.ct. One reason may be that gas undertakings were for the most part crippled by war conditions and needed to recover normal status before considering important changes; or thought that the wiser plan was to await better facilities in the matters of material and labour. Many who are inclined to take advantage of the new regulations do not at present feel at liberty to do so, and the majority who retain practically the former quality would be ill-advised to discard lightly the wider door opened by the 1920 Act; for, when clear of present embarrassment, they may have opportunity for full consideration of the value that would secure the greatest advantage both to their customers and to themselves.

If there exists such a thing as one fixed value that is equally desirable under all the various conditions of gas consumption, it will gradually acquire increased importance and prominence as the survival of the fittest; but the abandonment of all the benefits to the industry which are attendant on the right to change the declared value at any time is a heavy price to pay for the doubtful advantages that would follow the adoption of a national standard, and which, by the way, were not strongly in evidence at any time previous to 1920—nor has anything to the contrary been specially noticeable at a later period.

The clauses in the 1920 Act were not intended for the exclusive assistance of the undertakers. The interests of the consumers were viewed in correct perspective. While there is little difficulty in making out a case, on their behalf, in favour of full liberty, it is not such an easy matter to plead the cause of a national standard. The authors of the 1920 Act correctly assumed that, as business men, the directors of gas undertakings, so far from seeking to force an unacceptable value which for other reasons might be desirable, would look for one that would promote sales by giving general satisfaction. The introduction of one fixed value throughout the country would in many cases call for more extensive changes in the way of replacing existing pipes, fittings, and burners than have been necessitated by the operation of the 1920 Act. Consumers would not be willing to bear the expense. Many gas undertakings would be forced to accept responsibility for large outlay which did not carry corresponding advantage, and might result in actual loss.

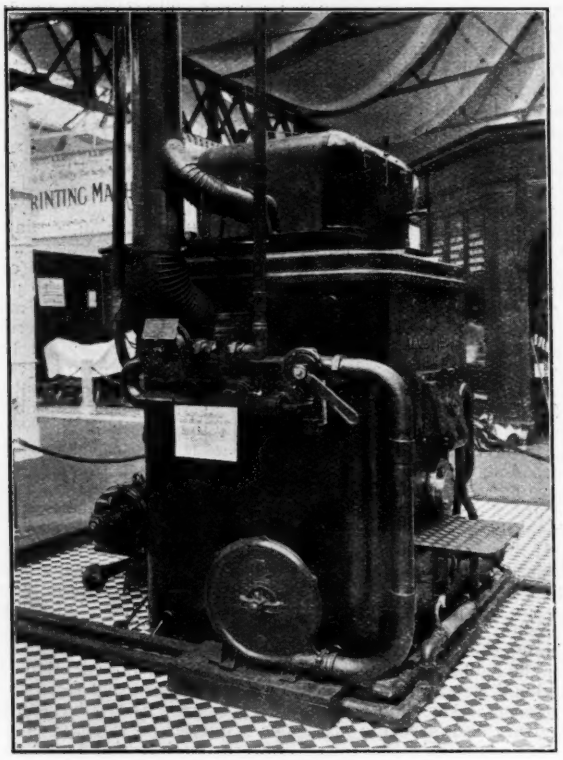
Much has been said about the selection of any Tom, Dick, or Harry as capable of efficiently carrying out the duties of an official gas examiner, with little or no regard to qualification. To quote one instance, a point was made of the selection of the owner and occupier of a small public house. The fact that the accepted candidate was a retired master gas apparatus erector, who, after many years of travelling, desired to settle down in quiet, but possessed an intimate knowledge of the gas industry and had at times taken entire charge of a gas-works, was evidently unknown to the objector. On the whole the appointed officials appear to have discharged their duties to the satisfaction of all parties concerned; and I have not heard of any returns being disputed on grounds of incompetence or negligence. The only objections hitherto published take the form of irresponsible comment by aggrieved parties who have experienced trouble with the gas supply, due to local defects, or, after a few years' enjoyment of a "slow" meter, have been provided with a substitute that complies with the requirements of the Sales of Gas Acts.

Smoke Pollution and the Nations.—The Czechoslovakian Academy of Agricture have put a proposal before the International Institute of Agriculture at Rome for the establishment of an international commission to study legal and other measures for the prevention of damage due to smoke.

PRINTERS' EXHIBITION.

Use of Gas in the Trade.

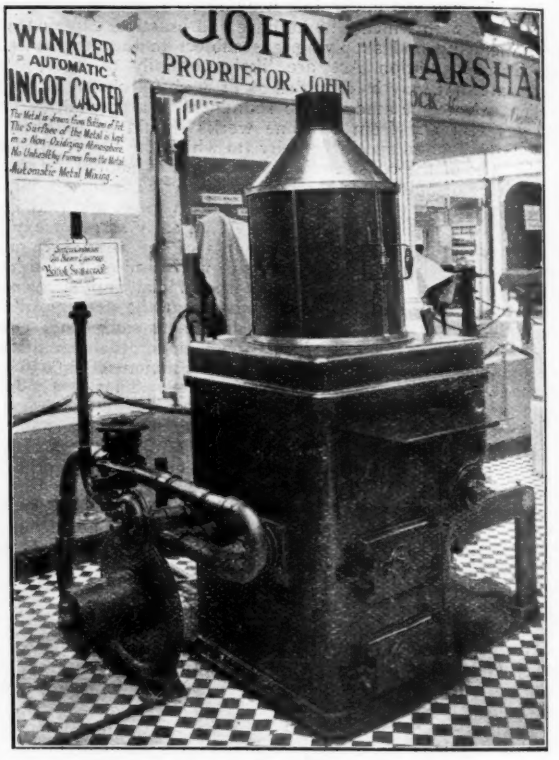
The ordinary member of the general public cannot help but be surprised at the scope of the printing trades. There is no industry which has developed more rapidly in recent years than the printing industry; and Britain does not lag behind in this respect. It is not necessary here to go into any detail in connection with this specialized trade; but it is interesting to note, from the point of view of our own gas industry, that the printing trade has been almost fully converted to the use of gas wherever the employment of that fuel is possible in their industrial processes. It is also interesting that some of the most recent advances in printing machinery have incorporated, where possible, gas firing equipment, and that the literature supplied by such makers of complicated machinery includes accounts of the advantages of the use of gas on their machines.



The Winkler Automatic Casting Machine.

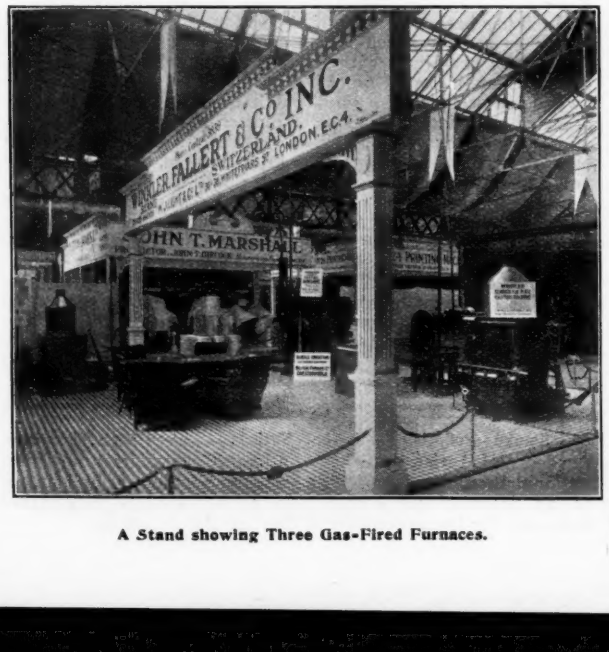
It is not generally realized that the printing trade in London has been converted to the use of gas. There were on view at the Printers' Exhibition, recently held at the Royal Agricultural Hall, the latest applications of gas in the printing trade. Practically the whole of this development has occurred during the last three years; and this has been made possible by demonstrating that gas can be applied to large-scale metal melting with enormous advantages over solid fuel, and by introducing equipment which requires for the same work done anything from 20 to 50 p.c. less gas than was previously the case.

On the stand of Messrs. W. J. Light & Co., of Nos. 36-38, Whitefriars Street, London, E.C. 4, were the Winkler automatic casting machines, which are claimed to have the biggest outputs of any appliances on the market. Metal was being melted and cast at the rate of 200 lbs. of stereotype per minute, which is 33 p.c. above the normal capacity of the machines. The gas consumption on this furnace is 570 c.ft. per hour during the working period of 6 hours, and 60 c.ft. per hour during the rest of the 24 hours when the metal is kept in a molten condition. The pot has a capacity of 2 tons of metal; and this quantity is melted-down, and raised to a temperature of 600° Fahr. in 1 hour from cold. The gas consumptions on this furnace can be taken as being 1 c.ft. for 10 lbs. of metal melted during the working period, and 1 c.ft. for each 6 lbs. melted when the gas consumption during the 18-hour holding period is taken into account. The furnaces are well insulated, and are heated by means of burner equipment supplied by British Furnaces Limited, of Chesterfield; the gas being at town pressure, and the air at 12 in. pressure.

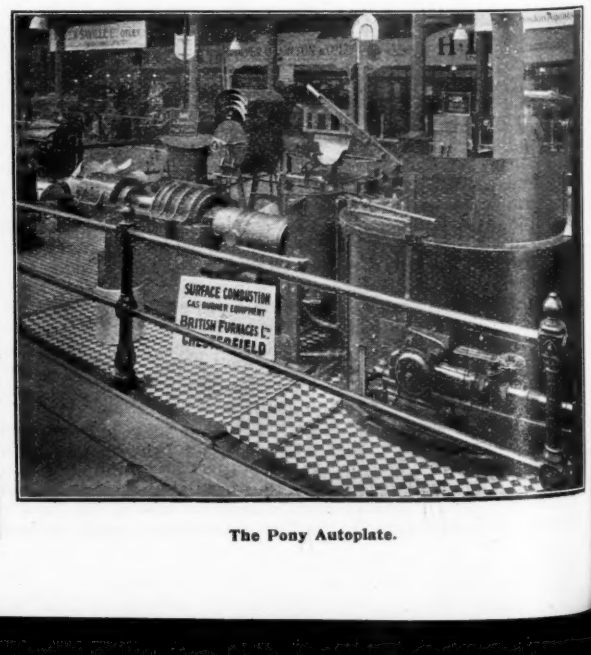


The Winkler Automatic Ingot Caster.

Another piece of equipment shown in actual operation on the same stand was the ingot caster. Similar results are obtained



A Stand showing Three Gas-Fired Furnaces.



The Pony Autoplate.

by means of gas to those obtained from the automatic casting machine. The capacity of the pot is 900 lbs., and it has a bottom discharge. It is claimed that this furnace has the highest output of ingots of any caster on the market.

All plant on this stand having gas-fired equipment was sold on the first day of the exhibition, and further orders have been received from printing offices in Glasgow, Cardiff, Leicester, and Blackpool.

Another of the leading stands showing printing machinery which requires furnace equipment was that of the Linotype and Machinery Company, Ltd., of No. 9, Kingsway, London, W.C. 1. This Company supplied Junior and Senior Autotype machines, and they demonstrated the use of the "Pony" autoplate machine. This equipment was also sold on the first day of the exhibition, and others are on order. Similar efficiencies are obtainable on this autoplate machine to those on the Winkler machine.

The following is a list of some of the newspapers and printing offices in which British Furnaces equipment has been installed: "Daily Express," "Daily Chronicle" (London and Leeds), "Daily News," "The Star," "Daily Mirror," "Daily Sketch," "Evening Standard," "Daily Sketch" (new buildings), Amalgamated Press, St. Clement's Press, Dellagana & Co., Cassell, Ltd., Wm. Clowes & Sons, "Morning Post," "Manchester Guardian," Crabtree & Sons, Leeds, "Sydney Morning Herald," Bell Punch Printing Company, Ltd., "Brighton Herald," "Yorkshire Evening Argus," and "Glasgow Evening News."

There are over 100 installations at the present time in London alone. Most of the equipment consists of specialized burners to which are attached patented inspirators, in which the automatic mixing of theoretical proportions of air and gas is ensured. The equipment requires gas at town pressure, and air from fan pressure. One concern alone in London is saving over 300,000 c.ft. of gas per month in its equipment, as compared with previous apparatus in use; and there has been no case of a cracked pot since the installation of the surface combustion principle. This has brought about a saving in this particular firm's case of about £2000 a year. In the majority of instances, however, the conversion has been made from solid fuel to gas, as few concerns had previously used gas in their processes.

GENERAL SALES PROPAGANDA.

By H. D. MADDEN, Engineer and Manager of the Cardiff Gas Company.

[A Paper before the Wales and Monmouthshire District Institution of Gas Engineers, May 28.]

When our President approached me in reference to a communication for this meeting, I had some diffidence in the choice of subject, but ultimately decided on a paper that would deal with showrooms and the value of publicity and propaganda by the judicious use of such prominently placed premises.

In the first place, the practice has been, and rightly so, to have the gas offices and showrooms in the principal thoroughfares of the town, and to provide the most attractive windows for the display of fittings and general gas-consuming apparatus. The ultimate object of this provision and display is largely, and more often solely, to increase the sales of gas; and it is noteworthy how effective these measures are throughout the country.

Are we content with the present-day business and uses of the showrooms, or shall we ask whether there are potentialities worthy of consideration and development? Unhesitatingly I answer that there are. In the first place, no gas-consuming apparatus should be shown or offered for sale unless it has first been tested and found eminently suitable and efficient in use with the quality of gas supplied to the district. The types should be carefully tested under conditions of pressure, with the actual gas provided; and this should rigorously be kept to a standard calorific value, and regular specific gravity and composition. With care exercised in manufacture, it is possible to reduce to negligible factor figures the limit of deviation from the predetermined values. Recognizing this, the Cardiff Gas Company recently arranged a physical laboratory wherein all domestic and industrial appliances are tested and carefully examined. We are thus able to deal with problems in more exact ways. Moreover, the outdoor staff are afforded every facility to visit this laboratory and gain first-hand knowledge of the methods of testing and the results obtained.

Give the salesman the best and most efficient apparatus, and eliminate all appliances which primarily may appear cheap, but ultimately prove troublesome and inefficient, and thereby cause annoyance, and result in dissatisfied consumers.

The showroom should be the place where the consumer can always call for advice and help, meeting salesmen he knows and who have his full confidence. Remember, also, that consumers call there to pay their gas accounts. If a friendly and good spirit prevails between the officials and the consumers, the company and the industry benefit. Generally speaking, this spirit of service and goodwill does strongly exist, and is being fostered and furthered by the salesmen's meetings and the Junior Gas Associations. Both are doing excellent work in this direction, and also in the education and technical advancement of sales staffs—most necessary factors to-day.

Every employee of the gas company who meets consumers is a potential commercial traveller for the company he represents, be he collector, inspector, or gasfitter; and it is vitally important for the industry that the men in these branches should be carefully educated, trained, and equipped with a sound knowledge of the application of the products the undertaking manufactures. At school we used to write-out the phrase "Knowledge is Power"; and this can be applied to the staffs of gas undertakings. Widen the view-point, and give the gasfitters, foremen, inspectors, &c., facilities to see how the gas is made, the care taken in its production and purification, how and why it is tested, and the bearing on its use and application. If this is done, it will be found that the outdoor staff will respond, and take a great interest in their daily routine, to the greater satisfaction of the consumer, and the ultimate benefit of the undertaking. In other words, give them a wider interest than the common round and daily task. Consider the human element, and make them interested and enthusiastic gas men. At the same time offer scope and encouragement to the individual.

In Cardiff, my Directors have tried this. Arrangements were made for the outdoor staff to visit the works in groups, and see the actual manufacturing processes, supplemented by a series of lantern-slide lectures throughout the winter months. These lectures dealt with raw coal, manufacture of gas, production of coke and sulphate, &c., and finally with the application of gas to domestic and industrial use. Several members of this District Association have attended some of the lectures, and will bear out the large enthusiastic attendances, the great interest taken, and the knowledge gained.

In this preamble it has been my desire to indicate that the fullest possible use of showrooms and propaganda sales work cannot be made unless the outdoor staffs have had good opportunities of learning of the application of the commodities provided by their respective undertakings. It will be found that acquired wider knowledge arouses in them enthusiasm and strong belief in the industry they serve.

Essentially the uses of gas are of primary importance, and should be at the fingers' ends of every member who has to meet the consumer in any capacity. There is, however, another side, products—*viz.*, coke, sulphate, &c. Examine the published balance-sheets of any undertaking. It will be noted that the revenue from coke takes a very important place; but does it show the figure we should like to see? The answer is in the negative.

Coke has very wrongly been considered a "Cinderella" among fuels. Why? Because we have not given it the attention it deserves or the publicity it warrants. Generally speaking, it has been sold in its raw state. The charges against the sales of the gas itself are very heavy, but coke, the ideal smokeless fuel, when properly prepared, has received in the past but scant attention. The charges against it are very small, and chiefly confined to the costs of loading; nothing, or practically nothing, being chargeable to its preparation or development. And then wonder is expressed at the position to-day!

Manufacture the best coke possible by selected and blended coals, and then give it publicity in the offices and showrooms. Let every consumer who comes in, whatever his business, see an exhibition of clean, good coke, in graded sizes for all applications, put up in attractive form, with proper literature as to its uses ready to hand. It will then begin to sell itself. Stress, however, must be laid on its exhibited appearance—the samples should be clean, well housed, and attractive to the eye. This method will do much to popularize, and further the uses of, coke for domestic and other work; and if carefully handled, it will compete with, and largely take the place of, anthracite in closed stoves and water-heating apparatus. It is astonishing how effectual is this form of publicity; but the showroom staffs must be in possession of correct knowledge regarding the suitability and uses of the different graded sizes, and be able to advise the consumer intelligently.

For the past year we have made this a point in our lectures, and have utilized our five showrooms and offices to exhibit the graded sizes as effectively as possible. From our experience, this publicity has been eminently successful in popularizing and stimulating the local sales of coke for many divergent purposes.

Since adopting this policy, we have taken a large number of orders in the showrooms, by reason of the publicity given to coke. Fig. 1 indicates an all-coke window at one of our offices, showing the fuels, methods of use, and appliances, both domestic and industrial.

Experience has already shown that local sales can be largely stimulated, and that the showrooms can enormously assist the sales of coke, and tend to put this valuable fuel and asset in a much higher and firmer position. The same may be said of the co-operation of the showrooms in giving publicity to the

FIG. 1.—AN ALL-COKE WINDOW.

sales and uses of sulphate; but the staff must have some intelligent knowledge of the subject. Recently my Company offered neutral dry sulphate in 7-lb. linen bags, with the instructions for use printed on the back. Prominence was given to the product in all showrooms; and the result was gratifying. In a few weeks over 1500 individual sales were made, in addition to many inquiries. Publicity brought this valuable fertilizer to the eye of the public; and they purchased heavily locally. The prominence given has also brought us inquiries for small quantities of one and two ton lots from small-holders many miles away. In addition there were, in that period, a large number of inquiries for information and literature, which will probably mature. In the town and surrounding districts, amateur gardeners, farmers, and others have awakened to the fact that gas companies make this splendid fertilizer; and the goodwill of our business can also enter into their gardening pursuits, if the showrooms make it possible. There is a still wider local field for this commodity in the form of lawn sand, which will find a ready sale in most of the towns and districts where there are large numbers of small grass lawns to the residences.

In moving among even educated people, it is appalling to find the ignorance displayed in conversation relative to the great services the industry renders to the country and in the homestead. The extravagant views held by the unthinking public (they have never mentally advanced beyond the lighting stage) regarding the expected uses and ultimate powers of electrical energy, would make even the most hardened electrical salesman blush. Propaganda by newspaper advertisement is good, but publicity in the offices and showrooms is better, more persistent, and lasting. Slowly but surely the public are realizing that our sister industry has a relative and wonderful position in the world, but also that the gas industry is filling an important place in our national and home life which no method of electrical application can ever hope to displace without leading to national danger and disaster.

Conservation of coal, the constructive distillation of coal for products for national requirements, heating, agriculture, road-making, and also defence—and, more important still, the 80 p.ct. thermal efficiency figure of the gas industry's method of coal usage—should be given the utmost publicity at all times in every office at which a gas consumer calls. Fig. 3 illustrates a case—we have one in each office and showroom—by which we keep this important fact before the public eye. Residual products of our industry's processes of constructive distillation of coal are exhibited.

FIG. 2.—SHOWROOM PUBLICITY.

Fig. 3.—A Show-Case of Gas Products.

Remember that in propaganda work you must keep on telling and hammering-in the facts until the public get an opinion firmly established in their minds. The British public have not yet realized that electric energy production yields at its best practice only 19 p.ct. of the total energy of the original coal used, with no residuals except ashes, and that normally only 10 p.ct. of the total useful heat of the coal is available for the use of the consumer. The truth regarding national coal conservation should receive its meed of publicity by showroom propaganda.

Then again, there is the work of public education regarding the matter of smoke abatement. The offices and showrooms can exert a powerful influence in forming public opinion on this important matter; and I think this is a subject in which the gas industry plays the leading part. The public have not yet mentally visualized this fact and the important value of increased sunshine, though, by the tremendous appreciation and the growing uses of gas and coke, it is evident there is an awakening in this direction, if partly with the object of solving some of the domestic problems. There is a direct relationship between smokeless towns and individual health; and the public will awaken to this fact if we give them the opportunity to learn, by persistent propaganda in our offices and showrooms, aided by intelligent advertising work. Fig. 4 shows an interested crowd at our Queen Street Office—a crowd indicative of several weeks' interest in our special line of propaganda work.

The interpretation is, therefore: Make your showrooms miniature Wembley gas shows, and, as the Americans say, "tell the world" the manifold services that the gas industry can render to the nation in the conservation of our coal, and the application of gas to domestic, industrial, gardening, agricultural, and road-making pursuits, and also the many other directions wherein we can render service, in the best possible sense of the word, to the public we serve.

Fig. 4.—Outside the Queen Street Office, Cardiff.

The salesman in the office must be trained to be the "Fidus Achates" of the consumer in every possible direction; and the showrooms and offices, coupled with the intelligent knowledge and equipment of the salesmen—a knowledge which the industry itself can and must provide—are a great asset to this end. Some may say this policy is only possible for large undertakings. I state definitely that publicity and propaganda for the sales of gas and products are possible for, and equally vital to the best interests and advancement of, any undertaking, be it small, large, or medium in size. Individual undertakings should draw upon such organizations as the British Commercial Gas Association, the National Gas Council, and the British Sulphate of Ammonia Federation, for the help, guidance, and assistance which they may require in the furtherance of their sales. Though these organizations do magnificent work, and are basic resources, they cannot be expected to do the detail work of local publicity and propaganda, which must necessarily fall to the lot of the individual undertaking. All should co-operate in local publicity.

Discussion.

The PRESIDENT (Mr. W. H. Johns, of Swansea) said the paper had been very interesting, and offered ample scope for discussion by managers of works of all sizes.

Mr. J. H. CANNING (Newport) said Mr. Madden had again made them his debtor by a paper, the chief merit of which was that the "preacher practised what he preached." There was nothing the author recommended to them for their consideration which he had not put into effect very successfully at Cardiff. He had fairly exhaustively gone over the whole question of general sales propaganda as regards gas, coke, and other residuals; and it would be impossible to deal with the paper in detail. He would like, however, to pick out one or two salient points, as matter for emphasis rather than discussion. The importance had been stressed of providing the most attractive showrooms for the display of fittings; and his (the speaker's) own experience backed this up. The more attractive they could make the window, the better would be the results. It was found at Newport that, when they could arrange a "live" or moving exhibit, it had a more pronounced effect than anything else in attracting the public. The paper really, he thought, might be summed-up in one brief sentence—the education of the public and the education of the staff. Upon these two points depended the success or otherwise of the undertaking. The author very rightly said that the general public, though they had been using gas for something like a century, were profoundly ignorant of its modern developments, and were consequently rather apt to be taken by the electricity propaganda. Gas people should not hesitate to keep on drumming into the public the many good points of gas, because no success in advertising could be obtained without constant repetition and perseverance. These were the great elements of success in advertising. The author had given them excellent advice with regard to the sale of coke; and the success that had been attained at Cardiff in this respect had been most gratifying. It seemed to him that they could all to a large extent, by following the advice given, promote their coke sales. By grading the coke, and by making the public aware of its vast possibilities, they could sell a great deal more of it in their districts than they were doing at the present time.

LOCAL EXHIBITIONS.

With regard to propaganda and advertising, there was one matter which Mr. Madden had not specifically included, and that was local exhibitions. At Newport much benefit had been derived from taking part in the travelling exhibitions which came along from time to time, and sometimes arranging purely gas exhibitions. Certainly this had had the effect of promoting sales. It was true that on several occasions their electrical competitors had exhibited under the same roof; but this was all to the good. Where the public had an opportunity of comparing the services rendered by both industries, gas people need have no fear whatever of the ultimate result. Some of them had been present a few days previously at the opening of a very interesting exhibition promoted by Mr. Jackson at Neath; and this, he was glad to learn, was giving excellent returns, in good attendances and large sales.

POLITICAL PROPAGANDA.

At the present time they had to face a particularly powerful phase of what one might call political propaganda in favour of their competitors. He did not think there was any need to go into this in detail. They all knew quite well what not only this Government, but two others he believed (all the political parties, in fact), had put forward as being a remedy for some of the existing social ills—namely, the granting of an enormous subsidy to their competitors, on the plea that the supply of cheap electrical energy all over the country would bring about a restoration of trade. He ventured to assert emphatically that no development of the electrical resources of this country would ever secure such a result, and that the present depression in trade arose from deeper-seated causes which were well known to those in power; but to put it plainly, they had not got the honesty to tell the public what these causes were. Unfortunately, to-day they had very few Statesmen and very many politicians; and there was a vast difference between the two. One of the chief arguments in favour of the development of cheap electricity in this country was that other people had developed their electrical resources, and consequently this country should do so. The truth was that, in general, electricity had only been widely developed in countries where considerable water power was available and at the same time coal was dear. In this country there was not the water power available, and coal was comparatively cheap; so that the conditions were quite different. One could well imagine that, in a country where

coal cost anything from £3 to £5 a ton, and water power was at hand, considerable economy could be effected by electrification; but in this country, where the only source of electrical energy was coal, and taking into account the fact that electricity yielded at best less than 20 p.ct. of the total energy of the coal, how could electric power show any economy as compared with the present use of raw coal? It might be said that electricity had not been given a chance; but it had been tried in this country. It had been pointed out by Mr. R. G. Clarry, in a very able speech in the House of Commons a few days previously, that the North-East Coast was supplied now with electricity at a price which would compare with the cheapest supply in any other part; and yet the industries were even more depressed, if possible, there than elsewhere. But it was not necessary to go to the North-East Coast for an example. Those who had gone over the great Ebbw Vale Works would have noticed that they were obtaining electricity from blast-furnace gases for practically nothing; and the same thing applied to the Powell-Duffryn concern, where they were producing from coke-oven gases electricity at quite a nominal figure, after deducting the value of the residuals. Yet, unhappily, these two undertakings were suffering from depression as much as the others. Therefore, he asserted that it had in no way been proved that electricity was going to be the panacea for industrial ills people were endeavouring to make out. Some of the greatest electricians objected very much to the exploitation of their industry by politicians. Pushing electrification could not bring about the abolition of smoke. Of course, in many cases electric power could be substituted for steam; but it must be remembered that steam was used in many industries for other purposes than power—purposes for which it was essential. Again, there were thousands, or even millions, of furnaces in this country used for metallurgical processes; and never would electricity be able to carry out the work done by these. With regard to boilers required for steam generation only, and metallurgical furnaces, gaseous fuel was the sole solution. As for cheap electricity solving the domestic smoke problem, this was even more hopeless. Some years ago the great Dominion of Canada, possessing almost unlimited water power, went into this matter, and they did so in a scientific manner. The whole subject was submitted to the Honorary Advisory Council for Scientific and Industrial Research at Ottawa; and their report, which might be consulted by anybody, pointed out that the entire power of Niagara was insufficient to heat the one city of Toronto. He might quote from the report these few words: "It is therefore hard to conceive of a time when electric energy will compete successfully and on a large scale with coal, oil, gas, &c., for heating." Then it was claimed that it would be an advantage to electrify the railways of this country. It was quite true that in Italy, with large water power resources, it had been practically necessary to electrify railways; but in this country there would be no economy whatever in doing so. Up to the present he did not think that a single responsible railway engineer had looked kindly upon the project, except in special cases and for short distances.

THE TRUTH ABOUT GAS.

As against all this, the gas industry had many advantages to offer. Instead of the less than 20 p.ct. of the heat energy in coal which the electrical people obtained, the gas-works recovered, in a form available for the use of the public, something in the neighbourhood of 80 p.ct. of the heat value contained in the original coal, and, in addition, immensely valuable residual products. They all knew the gas industry was not going to decay; but supposing the country was so misguided as to permit it to do so, all the essential things derived from these residual products would have to be imported by the various industries dependent upon them, who would probably have to "pay through the nose" for what they required. This was a position which could only be contemplated with the utmost disquietude. Mr. Madden had referred to the question of national defence; and in this connection it was remarkable to find that the public, just as they had already forgotten to a great extent the men who went to the front and fought for them, had also forgotten the industry which came forward at a time of national emergency to the support of the country. He did not wish to stress the matter unduly; but they would remember the following words of the late Lord Moulton: "Without the direct aid of the gas industry and the assistance of the knowledge which had been acquired by those who had devoted their lives to it, it would have been perfectly impossible for this country to wage the campaigns of the last three years, or even for any but a trifling time to resist the overwhelming flood of enemies that was poured upon it." In conclusion, he thought that the gas industry neither wanted a subsidy for itself, nor did it want to see a subsidy given to its competitors. The electrical industry was not in such a parlous condition that it could not secure money for its own development; and if the Government would only give both industries a chance, there would be nothing to complain of. The gas industry had no wish to belittle the immense service electricity could render in certain fields; but there were also other fields in which gas was infinitely superior. If the Government would just allow the two to compete with one another, without subsidizing either, it would be to the public good; and both would be able to develop their respective fields for the benefit of the country and its inhabitants.

Mr. W. CLARK JACKSON (Neath) remarked that the paper was very timely, because gas engineers even now were apt to consider their works first, second, and sometimes third; whereas they should at all times remember there were the consumers to be attended to. It was only by persevering in the education of the public that they could hope to develop the industry as it ought to be developed. Sustained publicity was essential; it must not be taken up, put aside for a time, and then taken up again. Unfortunately, many of them had difficulty in persuading boards of directors or members of councils as to the absolute need for the provision of adequate showrooms. He had himself laboured this point with his Council for a number of years. He had a small showroom which had done remarkably good work considering its size; but it was not sufficient for its purpose. Reference had been made by Mr. Canning to the exhibition at Neath. This was a great success, and the cookery lectures evoked much interest. They must strive all the time to get to the public. They knew themselves what could be done with gas, but the general public did not know. The photographs accompanying the paper would be particularly useful to the members.

Mr. A. E. DAVEY (Aberdare) referred to statements which had been made regarding the possibilities of low-temperature carbonization in this connection. He said it seemed to him that the great aim of people fostering these electrical schemes was to connect them with low-temperature carbonization.

Mr. R. J. AUCKLAND (Cardiff) thought the great value of Mr. Madden's paper was in its particularization. They had the "B.C.G.A.," who advertised in a general way, and in a manner which individual undertakings would find it impossible to do, for the good of the whole industry. But each undertaking could derive further benefit by particularization of the wares it had to put before the public. What was needed was to press home particular points in particular directions; and Mr. Madden had shown how this might be done with respect to residual products. Very large success had been achieved by him at Cardiff in this way; and other undertakings would similarly benefit by organizing specialized campaigns in certain directions.

THE SALESMEN'S CIRCLE

Mr. B. J. BELL (Cardiff) said he would like to take the opportunity, as Secretary to the local Salesmen's Circle, of appealing for stronger support. Of late the Circle had not been getting from the district the support to which it was entitled. If the efficiency of the undertakings depended upon the education of their staffs such meetings should have the fullest support. He hoped everything possible would be done to augment the attendances, so that such discussions as took place might be to the benefit of all concerned. It was of the utmost importance that there should be a better balance of attendance from the various undertakings, if the Circle was to be of the greatest possible value.

Mr. J. PROSSER JONES (Caerphilly) pointed out that, in addition to showrooms, publicity could also be advanced by means of literature. The showroom was very nice to look at, but many people would pass it by. What he did, in addition to showroom work, was to put a little advertisement on every gas bill sent out; and this advertisement was altered each quarter. This brought to the notice of consumers apparatus which perhaps they had not heard of before. Showrooms were, of course, essential; but they must be accompanied by propaganda in the form of literature.

The PRESIDENT proposed a hearty vote of thanks to the author, and said it was very important that all connected with gas undertakings in that area should do everything they could to cultivate sales of residuals in their own districts, instead of sending them outside. By so doing, they would assist in maintaining prices at reasonable level, with resultant benefit to the whole of the undertakings in South Wales. If they would take the trouble to send coke round the town in small lots by motor van, as had been done in certain cases, it would probably meet with success. They all realized that there was a very great future for gas; and, notwithstanding all that had been said about the development of electricity in Canada and other places, he had been given to understand that there was a progressive gas undertaking at the very foot of Niagara. If gas could meet competition at a place like Niagara, where power was practically free, it should be an incentive to the industry in this country, where things were different, to "put its back into it." He believed Porthcawl and Port Talbot were now entering into schemes for the provision of electricity. If the gas undertakings still maintained propaganda work, he did not think they would find that the introduction of electricity would affect them very much; but it was essential that the work done by the gas undertaking should be prominently put before the public, not once or twice a year, but practically daily.

HOUSE-TO-HOUSE CANVASSING.

He found in Swansea, at any rate, that the house-to-house canvasser was as good an advertiser as anyone, provided he knew his job. If he could get an interview with the housewife, more orders could be got in this way than in any other. At a recent exhibition in Swansea the Gas Company secured the largest number of votes of any exhibit. They must not forget the fact that it was not considered by some of the leading electrical engineers of the day to be a paying proposition to erect super-stations and distribute electricity therefrom over long distances.

The HON. SECRETARY seconded the vote of thanks, and drew attention to the fact that he had a collection of slides and a lecture on "Gas Manufacture," which anyone could have the loan of on applying to him.

THE AUTHOR'S REPLY.

Mr. MADDEN said it was always a pleasure to him to prepare a paper for the Institution. It was true that the "B.C.G.A." carried on the general propaganda; but each particular undertaking must be responsible for the details. This was the great point he wished to bring out. Literature and house-to-house canvassing were invaluable. In Cardiff they made tremendous use of literature; and much business accrued there from house-to-house canvassing. The output of fires and cookers, due to propaganda and publicity, was nearly three times as much as was the case before. He wished to pay a tribute to Mr. Bell, his District Superintendent, who worked so hard to make the Queen Street window a live one, that it won three prizes in Cardiff Shopping Week. The Company had shown industrial appliances, &c., at the local Engineering Exhibition, and had been astonished at the amount of interest taken in their stand. At agricultural shows, and such like, they had a marquee, and showed sulphate, and crops grown on sulphate. The Sulphate of Ammonia Federation came handsomely to their aid with literature in this connection. They also got the farmer interested in graded coke, and prepared tar for painting out-houses. The matter of low-temperature carbonization was one they must not allow to slip out of their hands. If there was any desire for low-temperature carbonization fuel—and there might be—the proper place to make it was at the gas-works, where they had nine-tenths of the plant that ac-

counted for the capital cost of low-temperature carbonization. Those who had been privileged to hear the able address of Mr. Milne Watson at the annual meeting of the National Gas Council felt that the case for the gas industry was in the best possible hands. ["Hear, hear."] But they must all get in a body behind him, to help him at every time and in every place. The most loyal support throughout was essential.

WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.

Treforest Low-Temperature Carbonization Plant.

At the invitation of Mr. D. Muir, M.I.Mun.E., Engineer and Manager of the Pontypridd Gas Department, the members of the Wales and Monmouthshire Junior Gas Association visited the low-temperature carbonization plant at the Treforest Gas-Works, on Saturday, May 23. Dr. S. R. Illingworth conducted the members over the plant and explained the various processes, following which an adjournment was made to the Municipal Buildings for a meeting, at which the President, Mr. B. J. BELL, took the chair, being supported by Mr. D. Muir, Dr. S. R. Illingworth, and Mr. King-Hiller.

The minutes of the previous meeting were confirmed; and the PRESIDENT extended a welcome to Mr. King-Hiller. He remarked that the Association had again been favoured by the opportunity afforded the members of observing the new plant at the Treforest Gas-Works, which was of much interest, particularly to those engaged on the manufacturing side of the industry.

Dr. S. R. ILLINGWORTH then delivered the following

ADDRESS.

I was invited by Mr. Muir to speak to you on low-temperature carbonization. We are all aware that the carbonization of coal is passing through a transition stage, due to the economic conditions under which we now labour. The carbonization of coal produces three main forms of fuel—viz., solid, liquid, and gaseous. Each type varies within limits. In regard to coke, we can ring the changes from a product of extreme hardness and limited combustibility, down to coke produced at the lower temperatures. The carbonizing works of the future, and the gas-works in particular, must, as Dr. E. W. Smith points out, become more and more a fuel works, supplying solid, liquid, and gaseous fuel of a type to meet local demand. Low-temperature carbonization of coal is one means of treating coal, producing certain products peculiar to itself; and only so long as these peculiarities are of economic value in competition with other methods, has it a place in practical politics. I make these remarks in the hope that you appreciate that there is, or should be, no antagonism between any of the several phases of coal carbonization. Low temperature has failed in the past to win a place in the sun, due to three specific reasons:

(1) The fuel has lacked a robust nature.
(2) The swelling of the coal in the process of carbonization has retarded or inhibited facile discharge from the retorts.
(3) Due in the main to the slow transference of heat throughout the charge at low temperatures, carbonization in bulk has not been a feasible proposition. Narrow-section retorts have been employed, and the consequent small capacity has resulted in high labour costs and concurrent high capitalization on the output.

Defects (1) and (2) are closely related, both as to cause and remedies. In 1909 I had recourse to the blending of caking and non-caking coals in connection with certain work in carbonization at low temperatures. More recently, as the result of purely academic work on certain coking coals commenced in 1918, the cause of the swelling of the coals became evident to me. Blending of coals, and also a process of pre-heating a bituminous coal alone, were worked, to avoid swelling and to produce contraction. Briefly, we can say that a bituminous coal commences to form coke at temperatures from 400° to 550° C. The temperature is a function of the carbon-hydrogen ratio; those coals of higher carbon-hydrogen ratio having the higher initial temperature of coke formation. The initial formation of coke is the more intimately concerned with the decomposition of the γ component—*i.e.*, that portion of a coal ultimately soluble in pyridine, and also in chloroform and benzene. Whether or not this be a primary constituent of coal, we will not discuss on this occasion. The γ compound is of a resin-like nature. It melts, conferring plasticity on the coal mass, at a temperature slightly below that of decomposition. All types of γ compound are decomposed as such at or below 450° C. Thus the initial formation of coke is completed below this temperature, which becomes some 100° higher on a practical scale, in order that the necessary temperature gradient exists within the charge. There exists within the coals a further series of components, referred to as the β type. These are of cellulosic nature. Their chief characteristic for the moment is the fact that they decompose at lower temperatures than the γ. The result is that the coal in the plastic state is distended by the volatile matter evolved from these β compounds, the action of which is analogous to the yeast in dough. Since these β compounds are the main cause of the swelling of the bituminous coals, and, further, since they are decomposed at lower temperatures than the γ compounds, it becomes possible to eliminate them from the coal at a temperature sufficiently low to avoid serious decomposition of the cementing material—*i.e.*, to avoid a coherent mass and serious impairment of the cementing power of the coal. This preliminary treatment of the coal is completed at an economic rate at temperatures in general around 400° C. The waste heat from the carbonization proper is of sufficient intensity and amount to accomplish this end. Consequently the pre-heating operation is analogous in function to an economizer on a boiler.

Coals in general evolve their volatile matter within two characteristic temperature ranges. One of these is below 500° C., the other is in the region of 760° C. I have referred to these as nodal points. The lower nodal point (*i.e.*, the one below 500° C.) varies with the carbon-hydrogen ratio of the coal. The higher nodal point is practically constant in all coals. The lower nodal point is around 275° C. for the lignite type of coals with a volatile about 45 p.ct., and the temperature at which it occurs increases with decrease of the volatile of the coal, until in the case of the anthracites (volatile under 6 p.ct.) it has ceased to exist. Now two facts operate in the swelling of coal: (1) The occurrence of a plastic state; (2) the amount of volatile matter evolved within the plastic layers of the coal when such plastic layers are undergoing decomposition. The persistence of the plastic layer is a question of the amount of γ component. The volatile evolved within this layer is a matter of the substances which undergo decomposition at or below temperatures at which the characteristic γ decomposes. You will appreciate that, if a coal with a very low nodal point (say, around 300° C.) be admixed with a caking coal, the plastic layers of which persist at 400° to 450° C., then the volatile from those substances which contribute to the nodal point at 300° C. will have been evolved from the coal prior to decomposition of the plastic layer, and will hence exert no distending influence on the coal. Moreover, the γ compound will have become diluted with the residue from the less stable coal, and hence the distending influence due to subsequent evolution of its own volatile will be minimized. It so happens that the coals poor in quantity and in quality of cementing material—*i.e.*, the non-caking or weakly-caking coals—are either possessed of a nodal point which occurs at a low temperature, or else, if they be non-caking coals such as the dry steams and anthracites of South Wales, they are possessed of no nodal point at all. We are thus able, from a knowledge of the nature of the gamut of coals, either to blend them or, in the case of bituminous coals, to preheat them so that the final product for carbonization has a specified nature in regard to γ content and the volatile matter evolved at temperatures below 500° C. Briefly, the general salient feature is that the γ content must not fall below 5 p.ct., and should not exceed 10 p.ct. Coal in this condition does not expand on carbonization, but contracts. While thus facilitating discharge from the retorts, it also gives a carbonized product of greater density and hardness.

I have touched on these points. They are not specific to low temperature alone, but appertain to all phases of carbonization. It is of interest to note that the highly-prized gas coals, such as those of South Yorkshire, are possessed of the specific features enumerated above as conditional to the non-swelling of the carbonized product. It is appreciated that other investigators have addressed themselves to these problems.

The third inherent drawback to low temperature has been attacked along a number of lines, which may be enumerated as follows:

(1) The method of the internal heating of the coal while the charge is at rest—*e.g.*, the Maclaurin method, whereby producer gas generated in the lower part of the retort heats the overlying charge by virtue of sensible heat carried upward by the gas. In this case fine coal such as duff cannot be used without briquetting. Moreover, the gas evolved is of a low calorific value.

(2) Internal heating with agitation of the charge—*e.g.*, the Nielsen process, wherein the charge is in a rotary retort through which hot gases are passed. The rotation tends to produce breeze.

(3) Briquetting of the charge—
(*a*) by pressure—*e.g.*, Sutcliffe process;
(*b*) by pressure *plus* heating of the coal—*e.g.*, Fuel Research method, &c.;
(*c*) by pressure and binder—*e.g.*, Fisher.

(4) Briquetting *plus* internal heating, or briquetting and heating the retort externally. The briquetted fuel is carbonized more rapidly than in the mass, due to the large free space for the gases evolved or introduced into the retort.

(5) Use of special forms of cast-iron retort.

(6) Heating in thin layers, as in the lead bath process of Caracristi.

Preliminary operations prior to actual carbonization naturally increase the total cost of production. These costs have to be offset on balance by such factors as greater throughput per capital unit of retort, increased yields of products, enhanced value of products, &c. These factors can only be assessed by actual works operations and tests against market conditions,

guided, of course, by previous experience as to renewals, maintenance, &c., in cognate procedure now in operation.

Briefly, then, from the modern trend of low-temperature carbonization, or in more general terms the carbonization of coal to produce a more mobile range of products to meet requirements for smokeless fuel and a desire for liquid fuel, the operations we have to visualize are:

(*a*) Preliminary treatment—viz., one or more of the processes of blending, preheating, drying, and briquetting.
(*b*) Charging operations in retorting.
(*c*) Retorting.
(*d*) Discharging and cooling of fuel.
(*e*) Condensing and recovery of bye-products.

Mr. Nielsen recently stated that the capitalization per ton for low-temperature retorts must not exceed about 10s.; and in this connection I take it to mean 10s. per ton capacity, with no additional cost for rendering the product marketable. With this view I agree.

We have endeavoured to bear in mind the general points outlined above in designing the plant you have seen this afternoon. We have arrived at this stage by three steps: (*a*) The laboratory stage, mainly concerned with the fundamental characteristics of the gamut of coal, and the influence of such on the behaviour of coals when carbonized. (*b*) The experimental stage, which aimed at testing our theories on a semi-commercial scale, and subsequently arriving at an economic design of plant to make them successful commercially. This we carried out at our experimental station alongside the Maritime Coke Ovens, from whom we drew our gas supply. We received every courtesy from their Manager, Mr. T. Watts, B.Sc. (*c*) The commercial scale. Our first commercial unit, as you have seen this afternoon, is erected at the Gas-Works, Treforest. You will note that we have refitted a bed of the intermittent vertical retorts, initially installed there by Messrs. Robt. Dempster & Sons, Ltd., of Elland. Messrs. Dempsters carried out this scheme for us, and we have received every assistance from their Managing Director, Mr. Broadhead, and Mr. Toogood and his staff. It is not my purpose here to describe all details of the plant. You have seen it in operation; and when we refit the whole installation of these intermittent verticals, the contract for which has been placed, it is our intention to invite the Wales and Monmouthshire District Institution of Gas Engineers and Managers to inspect the plant.

We are using a brickwork retort, and the heat is taken into the charge by H-section conductors made of cast iron. Each conductor is independent and is under no stress. Further, any one conductor is easily removed. Our ovens at Pontypridd are 9 ft. 6 in. long; and since, due to these conductors, we carbonize in five to five-and-a-half hours, our output per oven in the 24 hours is practically 7 tons. It may be of interest to remark that a brickwork oven without conductors, and of the width (14 in.) we use, normally takes some 28 hours to carbonize at corresponding temperatures. In these circumstances the fuel is over-carbonized at the oven walls, and under-carbonized in the centre. The fuel we make is homogeneous throughout, and the volatile is from 5 to 6 p.ct. The retorts are heated either by producer gas or by gas from the process. We have utilized the same charging gear as formerly employed for the bed when working for ordinary gas-works practice, and our labour costs are correspondingly low. Discharge from the retorts is facile, since, by blending or preheating, we guarantee shrinkage of the fuel. You will notice that the coal passes in continuous cycle from the siding, through the retorts, thence as smokeless fuel to wagons.

The yields of products we obtain are of normal nature. All types of coal can be used, provided one is bituminous. The lower the volatile, the greater the fuel yield, but the lower the gas and the oil yields. Broadly speaking, from the Welsh steam type of coals—volatile (say) under 20 p.ct.—we obtain 83 p.ct. of fuel, some 6 to 8 gallons of oil, and about 3500 c.ft. of gas (B.Th.U., unscrubbed, 750). With the higher volatile coals such as are used in the gas industry we obtain about 70 p.ct. of fuel, some 18 gallons of oil, and 5500 c.ft. of gas. One point in connection with the gas yield might be mentioned. The low-temperature gas yield is approximately 40 therms per ton from the higher-volatile coals, as against 80 therms from the high-temperature treatment. We have established that, on the same floor space and within the same cubic capacity as that previously taken for a ten-ton per day throughput of coal at high temperatures, we are obtaining twice the throughput of coal at low temperatures. Consequently the gaseous therm yield is roughly the same per 24 hours; but, of course, twice the weight of coal has to be handled. The therms are too "concentrated," and will need diluting with a weaker gas for distribution. If, however, gas has to be transmitted far—say, under a system of high-pressure distribution—such gas might be more economical, since, per cross-section of pipe, the therms transmitted would be greater. Maybe in future we shall centralize gas production at larger works, and distribute to substations.

In addition to this we can scrub (from the gas) some 2½ gallons of light hydrocarbons, benzoles admixed with naphthenes, suitable for motor purposes. We have not installed a benzole recovery plant at this stage, but we shall do so on the larger basis.

Ammonium sulphate is a problematical asset. True, due to drying the coal, we have an 8 to 10 oz. liquor, but I fear that in the future synthetic ammonia may render the recovery of ammonium sulphate from the liquor unremunerative.

The tendency in the past has been to concentrate attention on one or other of the chief products derived from coal, and regard this as the dividend asset. Nowadays we are regarding all the products from a basis of greater relative importance. Mobility of procedure is the desideratum. The solid form of fuel produced by low-temperature carbonization has a far greater market mobility than ordinary coke in its present form. The product we market is used as a domestic fuel in the open fire and kitchen range, for central heating, in bakers' ovens, for steam raising, and in anthracite stoves. Independent steam trials show that the fuel is equal to South Wales best steam coals. Low-temperature processes thus offer a means of satisfying the solid, liquid, and gaseous demands. The crux of the matter is that the local demand for solid fuel in competition with coal and coke will be such that the straight gas from the carbonization, when diluted with water gas, will furnish not less than the amount of gaseous therms required by the region in which the solid fuel is marketed. This visualizes nothing but a low-temperature process as the source of gas. One sees no reason why the two processes of high and low temperature should not work side by side, each finding its own level. If the demand be for low-temperature products, then this process will become established, if production and capital costs are within economic range. Low temperature enables a wide choice of raw material at a cheap rate in the form of all classes of small coal.

Discussion.

Mr. T. A. CANNING (Newport), in proposing a very hearty vote of thanks to Dr. Illingworth for his address, said he would like to have some further information in regard to the relative economies of preheating and blending coals, the maximum permissible ash content of the coal used, and the nature of the residue left by the fuel when consumed for domestic purposes. In regard to the figures put forward by Dr. Illingworth, the rate of depreciation was certainly liberal. Mr. Canning said that the future of the industry rested not only on gas sales, but also on the profitable disposal of their bye-products.

Mr. V. T. BLAKE (Cardiff) seconded the vote.

The PRESIDENT cordially supported the vote of thanks. The primary duty of a gas undertaking was to provide gaseous fuel in a form suitable for use in its district. Recently some anxiety had been occasioned many undertakings in disposing of solid fuel; but at Cardiff they had met the situation by grading. Dr. Illingworth had said that super gas-works might be created. It had been observed, however, that the distribution of gas beyond 20 miles was likely to prove more costly than the freightage of solid fuel and its carbonization at local gas-works. Assuming that cheap solid fuel was being produced capable of being utilized under all conditions, and at the same time a cheap gas was being made, what would be the effect one upon the other? With regard to the coal carbonized, would the reduction of 10s. per ton in price compensate for the loss of output in gaseous fuel? In his opinion there was a market for smokeless fuel.

Dr. ILLINGWORTH said the question of pre-heating or blending was largely determined by local conditions and the price paid for coal. With regard to the ash content of coal, under existing conditions one had to be satisfied with a maximum of 7 or 8 p.ct. No cinders whatever remained after the use of the solid fuel.

The PRESIDENT, in calling upon Mr. D. Muir to deliver his address, remarked that no one had done more to promote the welfare of the Junior Gas Association than had their host of that day.

METHODS ADOPTED TO DEAL WITH LEAKAGE IN COLLIERY DISTRICTS.

By D. MUIR, of Pontypridd.

The question of unaccounted-for gas is one which constantly demands the attention of gas engineers, but more particularly those situated in mining areas, where subsidence is prevalent. In such areas, broken mains and drawn joints become at times a veritable nightmare. All unaccounted-for gas is not due to leakage, as it consists of losses incurred when connections are being made on the distribution system for the purpose of repairs or extensions, joints and mains leaking, defective meters, public lamps remaining lit after their scheduled time, and difference in temperature between the works and consumers' premises. Where gas is leaking on the distribution system, it is a dead loss to the undertaking, and a source of danger and a nuisance to the general public.

The points enumerated are to be found in any normal undertaking; but in mining areas, where there is a continual movement of the ground, the work entailed in repairing mains and joints is considerable. The Pontypridd area of supply, being situated in a mining area, is no exception; and I will give you briefly the methods adopted to reduce the quantity of unaccounted-for gas in Pontypridd.

In the first place, I had the station meter tested, and found this correct. The holders were then subjected to an examination, and any leakages repaired. This satisfied me that no leakage took place at the works. Then the consumers' meters on the district were tested and overhauled; and the result of

the tests showed the numbers of meters fast and slow were fifty-fifty.

Attention was then directed to public lighting. I found that, as a result of low-grade gas having been supplied due to war conditions, the burners had been rimered out, and were passing double the quantity of gas they originally passed. This, however, was not being charged for, and alone accounted for about 4 million c.ft. annually.

After this matter had been rectified, I turned my attention to the mains and services. In our worst areas I installed Thorpe's diagrammatic meters. These have proved beneficial, as the diagram on the meter shows the hourly rate of flow, and when the flow exceeds the normal it is a good indication of a break in the main.

From observations made when services were bare for inspection, I came to the conclusion that a large number of services were in a very bad condition. I have accordingly re-laid whole streets of services; and it was really a revelation to find the number of services which were absolutely riddled with holes.

In one section of our area, I found a considerable quantity of gas being lost on a 10-in. cast-iron main. I accordingly stripped every joint, and no less than 90 p.ct. required setting-up. These joints had drawn due to subsidence. After a lapse of two years, one particular section again showed signs of drawn joints; and I felt convinced that it would be useless to keep setting-up joints on this particular spot. I therefore decided to fix Dresser split clamps over the spigot and socket joints. These consist of two split clamps, one of which acts as an anchor behind the shoulder of the socket, while the other presses into position a rubber clamp gasket, which is faced with strong duck. These clamps fit the ordinary lead joint; care being taken that the lead joints are well set-up to leave a slight recess into which the gasket can be fixed. These clamps have proved satisfactory; and no further trouble has been given on this particular 10-in. main.

In the Pwllgwaun area of our district, weekly trouble was being experienced on a 6-in. cast-iron main, due to subsidence. Some idea of the subsidence taking place may be gathered from the fact that the Colliery Company are continually repairing the houses in this street. The 6-in. main was continually breaking, and drawn joints were the order of the day. At last the trouble was so acute that a gang of repairers were there every week. After careful consideration, I decided to re-lay this main with solid-drawn steel main with plain ends and Dresser steel pipe couplings. The 6-in. Dresser couplings consist of two pressed-steel flanges, two rubber packing rings or gasket, one steel middle ring, with centre bead for perfect centring, and six bolts and nuts. These couplings combine flexibility and strength, and allow for contraction and expansion, as well as ground-settling. The Dresser steel flange is pressed from solid plate, and is therefore an endless ring, with no weld to break or open-up. The thickness of the metal on a 6-in. Dresser coupling is approximately ¼ in.; and the length of the middle ring is 5 in. The 6-in. main in question has been laid for four months. Up to the present no leakage has been found on it, and I do not anticipate any.

Prior to deciding on Dresser couplings for this particular job, I carried out a test with an 8-in. coupling connecting-up two lengths of 8-in. steel main with blanked ends; the total length being over 70 ft. I then pumped gas into this main up to 50 lbs. pressure, and found same to stand-up absolutely tight. The supports were then knocked out below the coupling, allowing it to drop 2 ft. 3 in. in the centre of the pipeline, and no leakage took place. The pipeline was again brought back to the horizontal, and still remained tight. I also tried the joint up to 150 lbs. pressure, and it remained bottle-tight.

Where movement of the ground is continually taking place, it is customary to find either the joints drawn with subsidence or the mains fractured, due to squeeze set-up. I have found Dresser couplings to act in both cases, owing to the contraction and expansion allowed with them.

In certain parts of our district, the mains are being pushed their whole length towards the other side of the road. This results in services on one side being pulled out of the main, and on the other side being buckled-up. To overcome this, I have made the connections from the main to the service with two brass fittings connecting a stout piece of S-shaped lead pipe. A better method is by the use of pressure Dresser couplings. These consist of a piece of 1¼-in. steel tube drawn down and threaded to 1¼ in. to enter the main. The other end has a flange welded on; the tube protruding for 3 in. past this flange. This tube is again drawn down to allow a 1-in. pipe to pass inside. A flange and rubber gasket with two bolts complete the joint. In use, the pressure coupling is screwed into the main in the usual way, the 1-in. service pipe passed through the flange inside the tube, and then tightened-up. This allows the service to draw-out for a distance of nearly 3 ft. without leakage when the main is being pushed away, and, on the other hand, allows the service to travel in nearly 3 ft. when the main is being pushed towards the service. This method has proved very satisfactory, and has eliminated our trouble in cases of the position of the main shifting.

The methods briefly enumerated here have proved beneficial, and have brought the unaccounted-for gas figure down to the lowest point since 1908. Even in cases where subsidence is not prevalent, I believe trouble is often experienced with drawn joints nowadays, due to the much heavier road traffic setting-up vibration. Dresser couplings would be very suitable in such cases. From my experience with these couplings, I have adopted them in the laying of new mains; and I find that, owing to their great flexibility, it is possible to wipe-out a good number of specials on the work.

I trust that these few notes may be of interest to the members of the Association, as I am sure such difficulties as we experience in Pontypridd are common to a number of undertakings embraced in your field of activities.

Discussion.

Mr. KING-HILLER, on being asked to speak, said that Mr. Muir should be congratulated upon the fact of his being the first gas engineer in Britain to discover the utility of the Dresser joints. His (Mr. King-Hiller's) experience with the joint dated back to 1910, when he went out to Canada to investigate a natural gas proposition which resulted in the formation of a large company and the laying of 170 miles of 15-in. steel main on which Dresser couplings were employed. The main was completed in six months, and careful test disclosed only one slightly leaking joint. The gas issued from the well at a pressure of 850 lbs. per sq. in.—being governed-down to 250 lbs. per sq. in., and, passing along the mains at this pressure, supplied Calgary and towns *en route*. The pressure at the end of the main was 50 lbs., which was governed-down to the town distribution pressure of 5 in. The question of leakage on distribution systems largely resolved itself into one of jointing. Run-lead or lead-wool joints could not remain permanently gas-tight, owing to the effect upon them of temperature changes. He had recently had an opportunity of observing what he presumed was the effect of the heavy traffic on gas mains in some of the chief thoroughfares in London, which were being relaid, and numerous joints were being reset.

Mr. COLLINS (Swansea) asked whether the testing of meters was carried out *in situ*, or were the meters brought to the works? With regard to public lighting, the experience of Pontypridd was, he thought, fairly general throughout the country, as a result of war conditions, and he would like to know if the burners were changed, or simply the nipples. On the point of service inspection, what system was adopted to ensure that every service was right, and was going to remain right? The method adopted in carrying-out repairs on slit collars would be of great advantage to many. He thought the Dresser couplings admirable; but, of course, in normal areas they were not faced with subsidence to the same extent as in colliery districts. In Swansea they had trouble in one area; but this had been overcome by the laying of welded-steel mains.

Mr. J. WOOD (Pentre) said that in clamps of which he had experience the rubber had perished. What would the effect be with the Dresser coupling in the event of this happening?

Mr. WILLIAMS mentioned that at Abertillery subsidence had brought about compression, resulting in the end of the main being forced right through the other joint, and the pipe splitting.

Mr. CANNING (Newport) said they appreciated Mr. Muir's kindness to the Association, and his readiness to assist them at all times. In regard to the Dresser joints, he would like to have some information regarding the life of the rubber packing.

Mr. A. H. SHEPHERD (Swansea), on behalf of the Association, asked Mr. Muir to accept a very hearty vote of thanks for so ably assisting them, not only that afternoon, but at all times since the inception of the Association.

Mr. D. M. JOHN seconded the vote. Leakage, he said, was a most serious problem in colliery districts, and in addition meters gave a deal of trouble. He had experienced difficulty with certain makes of meters of a particular period, but was not aware whether this applied generally.

Mr. MUIR said he appreciated the kind remarks which had been made. Replying to the various points raised, he stated that the testing of meters was carried out *in situ*. The burners of the public lamps were of the old upright pattern; and he had taken the opportunity of discarding these, and having them replaced by inverted burners. With regard to the inspection of services, if, after duly attending to the mains in certain areas, leakage was still taking place, the services were tackled wholesale, as generally they were also found to be too small. In respect of the rubber joint, observation had been made on a joint which had been in use for a considerable number of years, and no deterioration had taken place. He had every confidence that the rubber would stand. In the case of compression on mains, the Dresser joints would be found of advantage.

Following the meeting, the members were entertained at tea.

Gas for Cooking Potato Chips.—It is learned from "Industrial Gas" that in the vicinity of Baltimore a distributor of potato chips has developed a considerable parcel-post business with merchants in the smaller towns, which has been made possible by means of an interesting method of preparation. Cooking potato chips so that they will retain their flavour depends, it has been discovered, almost entirely on the kind of fuel used for the purpose. Gas in connection with surface combustion cookers seems to have solved the problem. In the production of potato chips, one of the most essential points is that the oil in which they are cooked should be kept uniformly at a temperature of approximately 360° Fahr. Too low a temperature of the oil will cause them to absorb an excess of oil before being properly cooked. Too high an oil temperature results in the majority of the chips becoming too dark before the rest have attained the desired colour. Gas was finally adopted owing to the uniformly ideal conditions assured by its use as a fuel.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

Report for the Year 1924

From Mr. H. Buckley, Hon. Secretary, we recently received the following report for 1924 of Lieut.-Col. Kenelm Edgcumbe, the Chairman of the National Illumination Committee of Great Britain, which was presented at a meeting of the Committee on Jan. 29 last.

The work of the Committee during the past year has been principally concerned with business arising from the Sixth Session of the International Commission on Illumination, which was held at Geneva in July, 1924. In this connection the Sub-Committees on motor-car headlights and on symbols and nomenclature prepared reports for presentation at the meeting. As regards the former, the view put forward by the British delegates, that it would be premature to propose standardization at the moment, was adopted. The symbols proposed by the British Committee were adopted, and several recommendations of the Committee dealing with definitions were approved. The British Committee was represented by the Chairman (Lieut.-Col. K. Edgcumbe), Dr. Kerr, and Messrs. H. Buckley, W. T. Dunn, L. Gaster, C. C. Paterson, J. M. G. Trezise, J. W. T. Walsh, and R. Watson. Unfortunately Mr. Butterfield, Mr. J. G. Clark, and Mr. P. Good were prevented from attending. Representatives of France, Italy, Switzerland, the United States, and observers from Japan and Poland attended the meeting.

Reports of the meeting prepared by various members of the delegation have appeared in the technical periodicals [see "JOURNAL," Vol. 167, pp. 446, 642, 697; Vol. 169, pp. 150, 219, 349, 538, 606; *ante*, p. 467]. The following decisions were arrived at as a result of the meeting:

(1) The International Commission recommended for international adoption as the primary standard of light the brightness of a black body operated under conditions subject to accurate specification, and further recommended that the National Laboratories be asked to take steps:

(a) To formulate standard specifications for the construction and operation of the black body as a primary standard of light;

(b) To fix upon a definite figure for the brightness as a function of the temperature of such body, expressed in international candles per square centimetre.

(2) A Sub-Committee was appointed to draw-up a vocabulary dealing with illumination.

(3) The Commission provisionally recommended certain values for the visibility factor.

(4) The Sub-Committee on heterochromatic photometry was asked to include in its work the study of the properties of absorbent screens.

(5) A Sub-Committee was appointed for the study of colorimetry.

DEFINITIONS.

(6) The following definitions were adopted:

(a) *The Transmission Factor* of a body is the ratio of the flux transmitted by the body to the flux incident upon it.

(b) *The Absorption Factor* of a body is the ratio of the flux absorbed by the body to the flux incident upon it.

(c) *The Reflection Factor* of a body is the ratio of the flux reflected by the body to the flux incident upon it.

The flux reflected according to the laws of specular reflection is called specularly reflected flux, and the corresponding reflection factor is called the factor of specular reflection. The flux diffused—*i.e.*, that sent out in directions other than that of specular reflection—gives the diffuse reflection factor. The total reflection factor is obtained by considering the whole of the flux reflected by the body.

(d) *The Total Flux* of a source is the flux emitted by that source in all directions.

(e) *The Upper Hemispherical Flux* of a source is the flux emitted by that source above the horizontal plane passing through its centre.

(f) *The Lower Hemispherical Flux* of a source is the flux emitted by that source below the horizontal plane passing through its centre.

(g) *The Mean Spherical Intensity* of a source is the average value of the intensity of that source in all directions in space.

(h) *The Mean Upper Hemispherical Intensity* of a source is the average value of the intensity of that source in all directions above the horizontal plane passing through its centre.

(i) *The Mean Lower Hemispherical Intensity* of a source is the average value of the intensity of that source in all directions below the horizontal plane passing through its centre.

(j) *The Mean Horizontal Intensity* of a source is the average value of the intensity of that source in all directions in the horizontal plane passing through its centre.

(k) *The Reduction Factor of the Mean Spherical Intensity* of a source is the ratio of the mean spherical intensity to the mean horizontal intensity.

(l) *The Efficiency of a Source* is the ratio of the total luminous flux emitted to the total power consumed. In the case of an electric lamp it is expressed in lumens per watt. In the case of a source depending upon combustion it may be expressed in lumens per thermal unit per unit of time.

(m) *The Visibility Factor* for monochromatic radiation is the ratio of the luminous flux to the corresponding energy flux.

The relative visibility factor of a monochromatic radiation is the ratio of the visibility factor of that radiation to the maximum value of the visibility factor.

(n) *Brightness.* The brightness in a given direction of a surface emitting light is the quotient of the luminous intensity measured in that direction by the area of this surface projected on a plane perpendicular to the direction considered. The unit of brightness is the candle per unit area of surface.

NOTE.—The above definitions are translated from the official French text. The official English translation will be published later.

SYMBOLS.

(7) The following symbols were adopted:

Luminous flux . . .	F	Transmission ratios .	τ
Candle-power . . .	I	Absorption „ . .	α
Illumination	E	Reflection „ . .	ρ
Brightness	B	Visibility factor . . .	K

(8) It was decided that at the next session a meeting should be devoted to papers and discussion on the art of illumination and the furtherance of good lighting.

(9) It was decided that questions relating to street lighting should be considered at the next session, and the National Committees were asked to study the subject and to transmit their communications to the Central Office at the earliest date possible.

(10) The report submitted by the Chairman of the Advisory Committee on the lighting of factories and school buildings was recommended as a basis for regulations or recommendations on the lighting of factories and school buildings.

(11) The National Committees were asked to study the question of glare from motor-car headlights, and to send their communications to the Central Office in ample time for the next session.

The following Committees have now been appointed by the International Commission; the representatives of Great Britain thereon being shown in brackets:

Heterochromatic Photometry and Colour Screens—(Dr. E. H. RAYNER).
Definitions and Symbols—(Mr. J. W. T. WALSH).
Lighting of Factories and Schools—(Mr. L. GASTER).
Motor-Car Headlights—(Lieut.-Col. K. EDGCUMBE).
Colorimetry—(Mr. T. SMITH).

It was decided to reduce the annual contribution payable by each country in view of the probable increase in the number of constituent countries. Great Britain will now pay about £77 per annum instead of £113 10s.

The establishment of a Sectional Committee on Illumination by the British Engineering Standards Association, mentioned in last year's Report, has now been carried out. The British National Committee forms the nucleus of this Committee which also includes twelve representatives of Government Departments, Manufacturers' Associations, and Technical Institutions. Five Sub-Committees dealing respectively with photometers, nomenclature and symbols, illumination glassware, fittings, and street lighting have been set up and have held a number of meetings.

Mr. Walter Waugh, Chigwell Hall, Essex, and of Coronation House, Lloyd's Avenue, E.C., chemical merchant, of Messrs. Blagden, Waugh, & Co., and Messrs. Walter Waugh & Co., left estate of the gross value of £322,010, with net personalty £257,670.

BUXTON CLAY CONVENTION.

Ceramic Society's Meeting.

In connection with the Clay Convention, organized to meet at Buxton, the spring meeting of the Refractory Materials Section of the Ceramic Society was held at the Palace Hotel, on May 19. There was a large attendance, and the proceedings were opened with Mr. J. HOLLAND in the chair.

A recommendation from the Council was adopted, by which North Yorkshire, Durham, and Northumberland were constituted a new district; and three members were elected on the Council to represent the district. It was announced that the autumn meeting would be held at Wembley, as last year. Mr. FRANK WEST, of the Derbyshire Silica Firebrick Company, Ltd., was elected President of the Ceramic Society, and occupied the chair for the remaining portion of the session.

The first item on the lengthy programme of papers was one on "Manufacture of Magnesite," by G. H. REED. In the absence of the author, this was taken as read, and will duly appear with the others in the "Transactions" of the Ceramic Society.

HEAT INSULATION.

Next came a valuable contribution by A. T. GREEN, on "The Heat Insulation of Kilns and other High-Temperature Installations." After a discussion on the losses of heat through kiln walls by conduction, radiation, and convection, the author proceeded to consider the possibilities of avoiding some of this loss by means of insulation—more especially in high-temperature work. The insulating materials available for use in high-temperature work consist mainly of slag wool and diatomaceous earth products. Slag wool has only a very limited application for such work, so that diatomaceous earth products furnish the bulk of high-temperature insulators. Diatomaceous earth, diatomite, kieselguhr, or infusorial earth, as it is variously called, consists essentially of silica; but the natural deposits contain variable proportions of impurities, such as lime, iron oxide, clay, &c., the presence of which is liable seriously to reduce the insulating efficiency of the material in practice.

The essential properties of insulating materials for high-temperature work are low thermal conductivity and high porosity. As a satisfactory guide for successful working, the coefficient of thermal conductivity should range between 0·00025 and 0·00050 at 400° C. The high insulating properties of such materials are in large measure due to the nature and quantity of the pore spaces, the size and disposition of which influence the heat conductivity. It is worthy of note that slag wool with a porosity of 88 p.ct. is not so good an insulator above 450° as diatomaceous earth brick with a porosity of 75 p.ct.; the pores in the latter material being much more minute and disconnected and evenly distributed. Most good insulators have an apparent porosity of between 70 and 80 p.ct.

Pure diatomaceous earth is highly refractory, and retains its porosity at about 1250° C. The presence of lime, iron oxide, clay, &c., in the finely-divided material leads to easy vitrification, with consequent high shrinkage and great decrease in the insulating properties. Slag wool is not reliable for insulating purposes above 700° C. For high working temperatures, a diatomite material containing at least 93 p.ct. of silica and less than 2 p.ct. of lime is necessary.

Insulating methods are extensively used in the iron and steel industry, resulting in fuel economy. In the gas industry the value of insulation is receiving keen appreciation; the results being fuel economy, with increased comfort of the workers in vertical retort plants. The effect of insulation of the tops of the settings by a layer of insulating bricks has resulted in a surprisingly great improvement in working conditions. In some works the fronts of the settings are similarly covered by a layer of insulating bricks. Incidentally, this insulation must give more uniform temperatures round the retorts, as well as some conservation of heat. Many gas engineers are now placing the insulating materials in the walls (instead of on the outer surface), with a view to greater heat conservation and even temperature distribution. In the "GAS JOURNAL" for Nov. 28, 1923, J. S. Thorman, in a paper read to the Southern Association of Gas Engineers and Managers, showed conclusively how insulation makes a waste-heat boiler system very efficient.

In his concluding remarks, the author stated that the selection of insulating material for high-temperature work cannot be based on insulating efficiency alone. It is absolutely essential beforehand to have a complete knowledge of the circumstances of its future use, particularly regarding the face temperature to which it will be subjected. The following data will then serve well in the selection: (*a*) The coefficient of thermal conductivity of temperatures between 300° and 800° C., or the insulating efficiency based on a test simulating industrial conditions; (*b*) percentage porosity, with some description of the nature of the pore-spaces; (*c*) refractoriness (*i.e.*, specification test), with the temperature at which the material disintegrates or otherwise loses its structure; (*d*) crushing strength as an indication of the mechanical strength.

"A Note on the Structure of a Fused Fireclay Crucible," by W. J. REES, B.Sc., F.I.C., was taken as read, and will be published in due course. Mr. REES read a paper by W. HUGILL, B.Met., and himself, on "The Effect of Repeated Burning on the Structure and Properties of Lime-Bonded Silica Bricks." In all, eleven reburnings were made. The results indicate the importance of the "soaking" period of the burn, especially of the first burn. There is very little change in volume after the first burn. Porosity falls steadily down to the seventh burn, with little subsequent change. Crushing strength increases notably to the seventh burn, and after the sixth burn a gradual increase in toughness is very noticeable. Lengthening of the "soaking" period of the burn will decidedly increase the mechanical strength of the bricks.

REFRACTORINESS AND AFTER-CONTRACTION.

Next followed a valuable paper by T. F. E. RHEAD, M.Sc.(Manc.), A.I.C., and R. E. JEFFERSON, M.Sc.(Manc.), A.I.C., of the Birmingham Gas Department, entitled "Notes on: (1) Testing for Refractoriness and After-Contraction; (2) A Few Experiences with Refractories in Vertical Retorts."

In the first part reference is made to difficulties arising in connection with the Institution of Gas Engineers' Specification. The test for refractoriness, first adopted in 1912, and modified in 1922, still leaves the possibility of different results being obtained for the same material, owing to the material being heated (1) to the specified Seger cone or (2) to the actual squatting temperature. A further modification is now proposed as follows: "A definite size of cone ground to the same shape as a Seger cone, with one edge perpendicular to the plane of the base, is heated with the base horizontal to the specified Seger cone, taken from the furnace, and examined with a straight edge, to see whether it shows signs of bending—this bending or matrix running out constituting the definitions of signs of fusion. The rates of heating and oxidizing are as before." It is proposed to call this "The Gas Engineers' Refractoriness Safety Test," to save confusion with the better-known squatting test.

From a routine testing point of view for commercial use, the above safety test offers several advantages: (1) It shows the softening of the material at a somewhat lower temperature than the squatting test. (2) With the squatting test it is very difficult to judge from the appearance in the furnace whether the material is being overheated, and a second test is often necessary. (3) By stopping the heating of the test-piece at the minimum specified zone, the wear and tear on the furnace is minimized. (4) It is much easier to stop a test at a given temperature when using a series of Seger cones than to stop when the test-piece itself shows signs of bending, rounding, or tip touching base. This is because of the additional information given by the behaviour of other Seger cones of the series. (5) The correct rate of heating during the last 100° to 120° C. is a matter of considerable difficulty—especially with a gas-heated furnace. This difficulty is increased the higher the temperature to be attained, owing to the diminishing head of heat between the flame temperature and the test-piece.

The chief signs of fusion which can be detected by the naked eye are: (1) Glazing of surface; (2) bending of test-piece; (3) swelling; (4) loss of angularity of edges; (5) matrix running out; (6) flowing. Many tests by different laboratories seem to show that with fireclay, silicious, and silica refractories a suitably shaped test-piece, heated under specified conditions, begins to bend, or the matrix runs out, either before or as soon as the other signs of fusion appear—with the exception of surface glazing. Mere surface glazing could not be held to represent failure. The amount of bending is the depth of the chord formed by placing a straight edge against the bent edge of the cone.

The refractoriness safety test has two important functions: (1) It determines whether a material has any claim to be classed as a refractory when tested under certain standardized conditions. (2) Being a moderately quick test, it gives the purchaser a fairly reliable check as to the constancy of quality of refractories coming from any particular maker. Too much must not be expected from the test.

The after-contraction test is probably the most important test in the present specification. It throws light on the correctness or otherwise of the heat treatment already given to the refractory by the manufacturer. Unfortunately, the correct interpretation of this test has been shown to be full of pitfalls; the result being affected by furnace design, as well as unequal heating, &c. From results obtained by the authors, it seems questionable whether determining the after-contraction at the one temperature of 1410° C., as per specification, is sufficient with certain refractories—*i.e.*, the composite fireclay-silica brick.

REFRACTORIES IN VERTICAL RETORTS.

Part II. of the paper gives some particulars relating to (1) measurements of the expansion of a vertical setting while being brought into commission; and (2) observations made during the dismantling of a vertical retort setting. The results and observations are discussed in some detail.

A second paper by W. HUGILL and W. J. REES was entitled "The Influence of Iron Oxide and Iron Sulphides on the Rate of Quartz Conversion in Commercial Silica Brick Manufacture." This was taken as read. The results of the investigation showed that the presence of iron oxide or iron sulphide had a favourable effect in increasing the rate of quartz conversion with the same heat treatment, and also in increasing the mechanical strength of the bricks.

Papers by Messrs. L. S. THEOBALD, B.Sc., A.R.C.S., and

A. T. GREEN were also taken as read. They were entitled "Observations on the Elimination of Carbonaceous Matter from Fireclay Bricks" and "An Investigation of the Changes taking place during the Industrial Burning of Fireclay Bricks." They had special reference to bricks made of Stourbridge clay, a Yorkshire fireclay, and a Scottish fireclay, and contained much useful data, &c.

The last paper to be read was by J. & W. B. MITCHELL, entitled "Laboratory Furnace for High Temperatures." This gave an account of a new type of electric furnace in which a metallic resistor is used in the form of a molybdenum wire wound round a small tube; a special contrivance being employed for protecting the metal from the baneful effects of high temperatures. This type of furnace is available for refractory testing, and also for other laboratory purposes, such as metal melting and the standardization of pyrometers at the high-temperature points.

A cinematograph film of the Derbyshire Silica Works was prepared to illustrate the process of the manufacture of carbonizing plants for gas-works.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Visit to the Wakefield Gas-Works.

The Association visited the works of the Wakefield Gas Light Company on Saturday, the 6th inst., with the object of seeing the work of erecting a new bench of horizontal retorts, consisting of six settings of ten retorts arranged in five tiers. The new bench will replace seven settings of eight inclined retorts.

The retort house was built 25 years ago, and contained a bench of inclined retorts consisting of nine settings. Three settings were added in 1908. The horizontal thrust on the discharging side of the inclined settings has distorted the retort house wall; the maximum distortion being 6½ in. As the movement of the wall in the year 1923-4 amounted to 1 in., it was decided where possible to build massive buttresses against the walls. These buttresses are 26 ft. high, 14 ft. at the base, and 23 in. thick, built into the pilasters of the building, which are 20 ft. apart.

It was further decided to remove the inclined retorts, which were worn out, and replace them with horizontals—this work to be done in two stages in separate years, as the Company possess no other carbonizing plant. The horizontal plant is so designed that no thrust from expansion will be carried to the retort house walls; the charging and discharging floors being entirely free from the retort bench.

In order to proceed with the work of demolishing the old settings of inclines, it was necessary to build a new chimney with which to work the remaining five settings, as the flue to the old chimney left the inclined settings at right angles under those to be removed. This chimney was built during last autumn and winter, being completed just in time for its appointed task.

Work was commenced on Feb. 1 by Messrs. Drakes, Ltd., to whom the carbonizing plant and stoking machinery, together with the generating plant, were entrusted. The first section of three settings should be ready for gas making on Sept. 1, and the remaining three settings on Oct. 1. The completed scheme will consist of two benches of six settings of tens. The existing coal plant will be used for a few more years. The coke will be dealt with by a retort-house conveyor to each bench—each feeding to the centre of the house into a yard conveyor arranged at right angles, which will convey the coke either into an existing ferro-concrete hopper or on to the yard as desired. The conveyors are of the "De Brouwer" type, being made by Messrs. W. J. Jenkins & Co., Ltd., of Retford. A 20-KW. generating plant in duplicate is being installed to provide the current for the stoking machinery. The coal conveyors and the coke conveyors will be operated by steam.

The two benches of retorts will have a capacity of 2½ million c.ft. of 500 B.Th.U. gas per day; the output of the superseded plant being barely 2 million c.ft. daily. It may be interesting to mention the fact that the gas sold for the year ended Dec. 31 last showed an increase of 7·37 p.ct. over that sold in the preceding year.

The visitors saw a blue water gas plant under process of reconstruction, and at the same time a duplicate plant in operation. New exhausters made by Messrs. G. Waller & Son, Ltd., and a rotary scrubber by Messrs. W. C. Holmes & Co., Ltd., were also inspected.

Tin Decorating by Gas.—It is stated by the "Intercolonial Gas Journal of Canada" that a large tin decorating works in New York some little while back scrapped an antiquated heating system, and substituted for it modern gas-fired ovens. During the first year this resulted in a fuel saving of $160 a month for four ovens. In addition, two men were shifted to other work, which represented a saving of $55 weekly. At the same time production was increased 17 p.ct. In this way, the new equipment actually paid for itself during the first twelve months of use.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Ventilate the Bath-Room.

SIR,—I have read with interest the paragraph entitled "Ventilate the Bath-Room" in the issue of the "JOURNAL" for May 27 (p. 583).

The suggestions made by your correspondent were, I think you will agree, fully covered in the Report and Specification submitted by the Gas Appliances Specification Sub-Committee to the National Gas Council in May, 1924—see paragraphs 5, 7, and 8 on p. 5 of the Report; also a paragraph on p. 10 of the Specification, headed "Instruction Plate for use with Geysers with Automatic Dual Valves."

INTERESTED.

June 3, 1925.

THE PARAGRAPHS REFERRED TO.

(5) **In the opinion of the Sub-Committee the existing type of instruction plate, constructed of a brass plate with stamped lettering, is not sufficiently legible, and it is recommended that an instruction plate (preferably of enamelled iron, with white letters on a salmon-red background) should be affixed to the geyser immediately over the spout, lettered in accordance with the Specification.**

(7) ***Ventilation.*—It is essential that the room in which the geyser is fitted should be adequately ventilated in such a manner that the ventilation may not be interfered with, but remain permanent. The vent pipe must be rigidly fixed, and not less in diameter than the flue spigot at the top of the geyser, and carried into the nearest chimney flue or through the external wall. In the latter case a suitable terminal or outside wind-guard must also be fixed. When a chimney is not available, or is defective, and the geyser is fixed immediately under a well-ventilated roof space, the flue pipe may be carried through the ceiling and fitted in the manner described in the Book of Instructions for fixing geysers issued by the National Gas Council. No geyser should be fixed without a baffle in the vent pipe, as near to the ceiling as possible.**

(8) **Two Instruction Cards should be supplied with each geyser—one for the fitter and the other for the user—containing full instructions for the fixing and use of the geyser.**

Instruction Plate (for Use with Geysers with Automatic Dual Valves).

This plate to be affixed immediately over the spout and to be enamelled with plain lettering (preferably with white letters on salmon-red background) as follows:

1. WELL VENTILATE THE ROOM.
2. Swing out the burner.
3. Turn on gas tap and light burner jets.
4. Swing in the burner slowly.
5. Turn on water tap slowly.
6. TURN OFF GAS BEFORE ENTERING BATH, and again MAKE SURE that room is WELL VENTILATED.

Heating Bath Water by Electricity.

SIR,—Having received an illuminating publication from you without any cost to myself, I suppose it is only right for me to give you a therm's worth of energy in return. It is rather surprising that some of my recent doings in Leeds should be so extensively known to you, but that my pioneer efforts on your behalf should be unrecognized.

Some ten years ago I had a brain-wave that coal-fired boiler plants at public baths—even granting a thermal efficiency on test of 75 p.ct.—were hopelessly uneconomical and wasteful, by reason of the intermittent character of our business. Owing to the good offices of the Chairman of a Gas Company, I was able to go pretty thoroughly into the matter of water-heating by gas with Mr. F. W. Dye, who was considered to be a most able man, and who had sufficient vision to see that in the heating of water for public baths there was unlimited scope for the gas engineer.

Unfortunately, the particular period was an awkward one for any sort of capital expenditure, and so the germ could not develop. Our idea was a battery of gas boilers sufficient in number for our busy periods, with an arrangement that only one could be utilized for our least busy periods, and that one be thermostatically controlled to give a minimum fuel consumption. Immediately I was able to put the idea into operation, the system was installed. Two very small establishments were dealt with in this way; the amount of water being heated per annum approximating two million gallons. This was only a small beginning; and I would suggest that it did not require a "real live" engineer, but, on the contrary, anyone who was not dead any higher than his boots, to see the wonderful vista of a huge business for the gas people.

Let us see what happened. The Out-Door Manager of the local Gas Company was extremely interested in the experiment, and in working-out fuel costs allowed for the usual trades discount of 35 p.ct. After the plants had been installed, I was surprised to find that the Board of the Company refused to allow me more than the general discount of 2½ p.ct., because public baths were not down on their list of "special trades"; and yet a trouser presser using a single gas-iron came under this special rate. In spite of repeated protests and pleadings, the Company turned a deaf ear.

The "real live" sparks from the wires of Poplar having come into contact with something that was in pretty bad "odour," had to get busy and do what was considered, and by your remarks is still considered, impossible. Poplar, you say, was wrong. The immediate effect was a special reduction of 10 p.ct. in the price of gas. An electric boiler was installed, and then the Gas Company gave way, and allowed the full 35 p.ct. discount. That is the finish of this story, and the "might have beens" have ended.

Regarding my paper, it is not so very surprising to me, after my previous experience, to find that the gas industry is still without "real live" people; for if they had not been "dead from the boots up," they would surely have quoted the free advertisement therein given:

> "When my Committee . . . I installed a series of small gas boilers. The success of this system may be judged by the fact that the cost per bath for gas worked out at 2·23d., at the cost of 3s. 9¾d. per 1000 c.ft., against a coal cost of 5·4d. per bath."

I had not intended to be cynical; but on opening your "JOURNAL," and reading your "Memoranda," I came across the word electricity so often that I wondered if you were out to "boost" your business opponents.

I would just like to say that I am not subsidized by either gas or electricity undertakings, and the personal antipathy of editors towards each other does not interest me at all. I heat about 50 million gallons of water per annum; and the fact remains that the gas people just threw this business away—and who knows how much more?

L. JEFFERSON-HOPE,
Chief Superintendent.

Baths and Wash-Houses Department,
Metropolitan Borough of Poplar,
Roman Road, London, E. 3,
June 2, 1925.

[Reference is made to this subject in the "Electricity Supply Memoranda" to-day.—ED. "G.J."]

REGISTER OF PATENTS.

Apparatus for Lighting Gas.—No. 232,645.

TODMAN, J. C., of Acton, W. 3, and METCALFE, F. E., of Waltham Abbey.

No. 27,600; Aug. 1, 1924.

This invention relates to apparatus for lighting gas by the interposition of a glowing filament in the path of the gas as it emerges from the burner.

The patentees claim: A combined gas and electrical switch for use in gas lighting apparatus comprising the combination with a gas cock of a stationary insulated electrical contact ring and a contact piece moved outwardly into sliding contact with the inner surface of the ring by the initial movement of the parts when the operator exerts a pressure to turn on the gas.

Grids for Purifiers.—No. 232,791.

SPENCER, J. A., of Southall.

No. 12,068; May 16, 1924.

This invention relates to the construction, arrangement, and combination of elements forming grids, for gas purifiers, of the type in which two rows of bars are separated by bearer bars so that the rows break joint; and the object of the invention is an improved construction whereby a series of pockets is formed between the two rows of bars in each grid, which assist in supporting the purifying material in superimposed layers, prevent each layer from unduly settling and varying in density, or the upper layer from falling or settling upon and compressing or increasing the density of the layer below. Only one upper grid is necessary in purifiers 4 ft. deep above the bottom grids, or two upper grids for purifiers 5 ft. or 6 ft. deep.

The grid embodies two rows of bars for supporting the purifying material. The bars are arranged a pre-determined distance apart in each row upon tie rods or cross-pieces of timber which pass through mortised holes therein, and are prevented from shifting their positions by dowel pins or nails. A layer of these support-bars with their cross-pieces is arranged upon each side of bearer bars or distance pieces running at right angles, and the bars in each row are so arranged relatively that they break joint with the bars in the other row.

The design of the grid is fully described and illustrated in the specification.

Purification of Gas.—No. 233,011.

COBB, J. W., and HODSMAN, H. J., both of Leeds.

No. 308; Jan. 4, 1924.

This invention is for an improved process of purifying fuel gases relying upon the use of contact materials, such as iron oxide or iron oxide containing materials, in a heated state for effecting the partial oxidation of hydrogen sulphide by the free oxygen of the gas. According to the claims, the process comprises subjecting the gases to the action of contact materials, such as iron oxide, adapted to secure the partial oxidation of the hydrogen sulphide under conditions of temperature and humidity which will ensure that the free sulphur formed shall be carried forward from the contact bed and that the latter maintains its activity, and utilizing ammonia to enable the removal of sulphur dioxide present after partial oxidation of the hydrogen sulphide to be effected by condensation and washing operations.

The ammonia content of the gas is adjusted to ensure that, under the conditions in which the treatment with hot iron oxide and the further treatment of the gas is carried out, the acidic oxygen containing sulphur compounds may be effectively removed.

After subjecting the gases which have passed through hot iron oxide to condensing and washing processes, they may be passed through a cold oxide purifier to remove any residual hydrogen sulphide.

The patentees give the following example of working. A coal gas prepared for town supply, the composition (by volume) of which when purified would be substantially as follows, was treated:

CO_2	3·0 p.ct.
C_nH_m	2·5 ,,
O_2	1·0 ,,
CO	13·0 ,,
CH_4	24·5 ,,
H_2	37·0 ,,
N_2	19·0 ,,

The gas entering the purification apparatus, in which the iron oxide was maintained at a temperature of 300° C., contained per 100 c.ft. 140 grains of ammonia, 570 grains of H_2S, and 1·9 p.ct. by volume of oxygen. On leaving the apparatus, 50 grains of ammonia, 80 grains of free sulphur as H_2S, and none as sulphur dioxide, and 0·5 p.ct. of oxygen were present in each 100 c.ft. of the gas after washing.

MISCELLANEOUS NEWS.

GAS SUPPLY OF PLYMOUTH.

In Plymouth there are two separate gas undertakings—one at Devonport, the property of the Corporation, and the other at Plymouth, belonging to a Company. Plymouth became possessed of its own gas undertaking when, ten years ago, it spread its tentacles westward and took the naval and dockyard town of Devonport within its grasp. When the Gas Committee presented a favourable report of the undertaking to the Town Council last week, several members urged that its prosperity was an argument in favour of municipalization, and suggested that the acquiring of the Plymouth Gas-Works should be considered.

The Chairman of the Gas Committee (Major J. Clifford Tozer) stated that during the past year the undertaking had made a net profit of £10,524, which would be transferred to the reserve fund. They had had a record output of 792 million c.ft., and had reduced the price of gas by 2d. per 1000 c.ft. His Committee recommended that the salary of the Gas Engineer (Mr. W. P. Tervet) should be increased from £725 to £800 per annum, and thereafter by annual increments of £25 to £850. In arriving at this decision, the Committee had been guided to a large extent by the satisfactory position in which they found the undertaking. The success was in a large measure due to the activities of the Gas Engineer, who had held the position for seventeen years, during which time the output had been trebled.

Mr. E. W. Perry congratulated the Chairman of the Gas Committee on the "magnificent report," and suggested, after such a fine record, they should now acquire the Plymouth Gas-Works, so that the Plymouth ratepayers could join in the pæon of praise. Alderman J. J. H. Moses said things commonly necessary should be commonly owned. Those things essential to the lives of the people should be controlled by the people, and not be in the hands of certain individuals so that they might "squeeze profits." The result of their gas undertaking justified what the Labour Party had been advocating. Mr. G. P. Dymond said the reason why the Devonport undertaking was so prosperous was because it had by its side the evidence of what could be done by private enterprise, so far as the Plymouth Gas Company were concerned. It was not a question of ownership, but efficiency in management. It did not matter whether it was publicly or privately owned.

The minutes were approved.

BURNLEY GAS DEPARTMENT.

In his annual report, Mr. J. H. Clegg, the Gas Engineer to the Burnley Corporation, states that there was a net profit of £38 after payment of capital charges. The price of gas had been 8½d. per therm, and the year's result was far better than was anticipated. The gas sent out showed an increase of 1·85 p.ct., and the gas unaccounted for was 4·52 p.ct. of the make. The sales by prepayment meter were increasing annually, being now 46 p.ct. of the total. After dealing with the slump in residuals, Mr. Clegg states that the department are giving more attention to domestic consumers of coke, and by this hope to lessen the difficulties. If, he says, every gas consumer used a hundredweight of coke per month, there would be no necessity to export a single ton. The production of ammonia was not high enough in his estimation, and he attributed the loss to the inefficiency of the present scrubbing plant, and its small capacity. The sulphate plant was very old, and not now efficient, besides being unable to cope with all the production of ammoniacal liquor last year. A Pelouze and Audouin extractor was now being fixed to improve the results, or, at any rate, to prevent further decline. The average value of the gas supplied was 479 B.Th.U. The waste-heat boiler had relieved the strain on the Lancashire boilers, which had been overworked for some years. By its use, 1600 tons of coke had been saved. The pan ash washer had already recovered 340 tons of coke, and saved £65 in cartage to tip. The full value of these recent installations would not be realized until the coke market was more normal. The new 3 million c.ft. gasholder had been put into use; and when the new governor house was completed this month, gas could be served direct from that station. The whole of the street lamps, with the exception of 28 high and low pressure lamps, had been fitted with controllers, and greater regularity of lighting had been obtained, and a reduction had been made in the number of mantles used. During the past year, sixteen beds in the inclined retort house were reset, and during the present year a further ten settings would be renewed. This would recondition half their plant for a further period of approximately five years. The remaining carbonizing plant and C.W.G. plant was now ready for scrapping, and was very unreliable. These remarks applied also to a portion of the subsidiary plant; and unless the first unit of the new plant at Old Hall was ready for gas-production in the winter of 1926-27, it would be necessary to expend a substantial sum of money on the present works to ensure a proper supply of gas adequate in quantity and quality.

BOLTON CORPORATION GAS ACCOUNTS.

Reporting to the Town Council upon the results for the year ended March 31, the Bolton Gas Committee state that the quantity of gas made was 1,217,213,000 c.ft., compared with 1,178,961,000 c.ft. in the previous year. Mr. Thomas Glaister, Chairman of the Committee, puts on record his appreciation of the support given to him by the Committee, and congratulates the Engineer (Mr. W. J. Smith, B.Sc.) and his staff on their whole-hearted co-operation.

The accounts, prepared by Mr. W. J. Jeffries (the Borough Treasurer) show a gross profit of £66,750. The sum of £14,000 has been placed to the depreciation and renewals fund, the revenue contributions to capital amount to £4008, and a balance of £24,387 remains to be carried forward.

ROCHDALE GAS MANAGER'S RESIGNATION.

Mr. T. Banbury Ball Disagrees with the Policy of the Gas and Electricity Committee.

Reference is made elsewhere in this number of the "JOURNAL" (see p. 719) to the resignation of Mr. T. Banbury Ball, Manager of the Rochdale Corporation Gas-Works, owing to his disagreement with the policy of the Gas and Electricity Committee, who recommended that electricity only should be supplied to 66 Corporation houses to be built. The policy of the Committee—which had been endorsed by the Housing Committee—was debated at a meeting of the Town Council last Thursday.

Alderman BLOMLEY, moving the adoption of the minutes of the Gas and Electricity Committee, said he should feel that he was very remiss in his duty, as Chairman of the Committee, if he did not refer to the resignation of his old friend, Mr. Ball. He would allude to the matter briefly, but none the less sincerely, because during the years he (the speaker) had been a member of the Council he had had the highest regard for Mr. Ball. As a public official, Mr. Ball had rendered exceedingly good service to the ratepayers; and he regretted very much the reason for Mr. Ball's retirement. They knew that the time came for men to retire from public service and from a life of activity, and on behalf of the Committee he could only say they deeply regretted the decision Mr. Ball had come to. ["Hear, hear."]

Alderman WATSON, referring to the Committee's decision to instal electricity only in 66 new Corporation houses, asked whether the Committee had had any communication with the prospective tenants with reference to the matter.

Alderman DIGGLE wished to know whether the decision was come to after hearing both sides.

Alderman DAVIDSON remarked that he supported the question put by Alderman Watson. He would also like to know the circumstances which led to the resignation of Mr. Ball.

Alderman BLOMLEY replied that he was not aware of any request that gas should be supplied to these dwellings. The Committee considered the whole question, and had acted in the usual business fashion. There had been no change of procedure between the Gas-Works Sub-Committee and the Electricity Sub-Committee in dealing with the various questions which had been brought before them. Consultations between heads of the departments had not been held on any previous occasion. Each Manager had brought forward what he thought right and proper for the success of his department. Such communications had been very carefully considered; and the decisions of the Committee and Council had been carried out.

Alderman WATSON was surprised that, in a manufacturing town like Rochdale, the Gas and Electricity Committee should decide against installing gas in 66 Corporation houses. He had raised strong objection at the meeting of the Housing Committee to this decision. Electricity was very useful in a house, but every one could not afford the extra few shillings a week to pay for electric fittings. What would happen, he asked, if, as had occurred, the electric supply failed for some hours—say, when dinner was being cooked? He hoped the Committee would consent to instal gas in these houses.

Councillor R. TURNER said he had hoped the Chairman would have told them something about the experience of other places, which had adopted electricity and no gas in a number of houses.

Alderman WYCHERLEY (the Chairman of the Housing Committee) pointed out that if the electricity supply failed when dinner was being cooked, the tenants would have the coal fireplaces to fall back upon. Looking at the question from the point of view of the Corporation, he understood that in many of the houses there was a very small consumption of gas for cooking purposes. The Housing Committee had ascertained that the following Corporations had installed electricity only (with coal-burning fireplaces) in a number of their houses: Hackney, Woolwich, Newcastle, Glasgow, Marylebone, Norwich, Bolton, Sunderland, Haslingden, and Manchester. A great deal had been said about the cost of installing electricity in these houses. Before deciding the Committee went into the question of cost, and, taking everything into consideration, they were of opinion that the sum was a very modest one, and within the reach of all the people in the town. As compared with gas, electricity was cleaner, healthier, and he believed it was now no more expensive in consumption, than gas. In the case of a particular house among those on the Spotland Estate, in which there was electric lighting and electric power, the cost was: For the September quarter, 15 units for lighting and 219 for power, which cost 1s. 9d. per week; December quarter, 2s. 7d. per week; March quarter, 3s. 7d. per week. He was given to understand, and he could substantiate it from his own personal experience, that it was possible to do the cooking and washing under the modern conditions as to electricity in an ordinary house—ordinary cooking and ordinary washing—for not more than 2d. and 3d. for both on one particular day. He did not think it would be argued that this was beyond the reach of the working man. Surely the Council ought to look forward; and the Committee were of opinion that electricity was a thing of the future, and gas to a large extent a thing of the past.

Alderman DAVIDSON prefaced his remarks with a tribute to Mr. Ball as an old and valued servant with a fine record of service. By his work and his high character, he had gained the respect, the esteem, and the goodwill of everyone with whom he had come in contact. Even the grounds of Mr. Ball's resignation did him credit; for what better proof could be had of a man's keen and conscientious devotion to his department than the action he had taken? He had made a sacrifice, and had shown that he really lived for his department. ["Hear, hear."] It did seem strange that the Council should be asked to go out of their way to say or do anything which would depreciate the gas undertaking in the eyes of customers or ratepayers. In some towns that had been mentioned the gas supply was in the hands of private companies, whereas in most cases the electricity supply was in the hands of the corporation. One could well understand the corporation pushing its own commodity in those circumstances, because in some cases they were out to purchase the gas undertakings, and by reducing their value to get them on the best possible terms. In Rochdale, however, the Corporation owned both these monopolies; and yet they had gone out of their way—by the present policy—to say that gas was played out. At the same time the Gas Committee were proposing to spend £40,000 or £50,000 on their undertaking. In his opinion a very strong case was made out for a separate and independent committee to control the gas-works. He was afraid there might be some difficulty in getting a first-class man to undertake the management of the Gas Department if the Corporation was going to say that they were biased in favour of electricity. Mr. Wycherley had said that the income from gas in respect of the Corporation houses was very small, and that the tenants had really settled the matter themselves. He had heard it stated in the Finance Committee that the gas accounts of these houses were as low as 3d. per house. What were the facts? The capital expenditure on 557 houses for electricity was £5076; for gas £5093. The income from electricity was £1441, and from gas £1332, or £2 6s. per house—representing a return of 26 p.ct. of the capital outlay. Mr. Wycherley said that there was a small consumption of gas for cooking purposes in these houses; but as a matter of fact there were over 400 gas cookers in use in the 557 houses. No gas was available for lighting because electric fittings had been put in. He hoped the Committee were right in their calculations, and that taking into account the cost of appliances the electricity service would be no dearer than gas. The rents of these houses were high enough; and if on top of the rent the tenants were going to be forced to pay more for electricity than they would have had to pay for gas, it would add very materially to the cost of living. By excluding a gas service from the housing estate the Corporation was virtually proclaiming that gas had been played out, and he was rather disturbed by the proposal.

Alderman CLARK said no one regretted more than the Committee themselves the attitude which had been taken by Mr. Ball. Alderman Blomley and himself had been deputed by the Works Sub-Committee to wait on Mr. Ball and ask him to withdraw the reason given for his resignation. They tried by every possible means to persuade him to do so, because they felt that the service which he had rendered to the Corporation and the town was too good to be spoiled by a reason of this kind. The Committee regretted exceedingly that Mr. Ball should have adopted this as a reason for giving up. The Committee believed that there was a great future for gas as well as for electricity. But on the present occasion the Committee, he believed, were acting in the interest of the Corporation, and the Housing Committee were also of that opinion. They believed that they would be able to save something like £30 or £40 per house by adopting the policy which was recommended. In these circumstances were not the Committee justified in trying an experiment which had already been tried in a number of other towns? One often heard random statements about the cost of electricity, but, as the Council knew, it was a commodity which was coming nearer to the pre-war price than any other commodity he could mention.

Mr. LORD said the Committee were merely desirous of making an experiment. He added that the installation of a dual service of gas and electricity on the Spotland Estate had been criticized by the Ministry of Health, who were of opinion that one service was redundant.

The minutes were passed; Alderman Watson alone opposing them. Similarly, after discussion, the minutes of the Housing Committee were approved—Alderman Watson dissenting.

SAFEGUARDING OF INDUSTRIES ACT.

Gas Mantle Inquiry.

The Committee appointed by the Board of Trade (and presided over by Sir Frederick Mills) to consider the application of the Incandescent Mantle Manufacturers' Association for an import duty on foreign gas mantles resumed their inquiry at the Offices of the Board of Trade, in London, on Thursday, June 4. (The previous proceedings were reported in our issues for May 27, p. 610, and June 3, p. 678).

The whole of the morning session of over three hours was occupied by a long cross-examination of Mr. G. P. H. Soper (for the Mantle Manufacturers' Association) by Mr. Macaskie (who represented the importers opposing the application).

Mr. Macaskie's first questions were put with the object of obtaining an admission from Mr. Soper that the prices of British mantles were fixed by the Association. It was not one of the objects of the Association, said Mr. Soper, to fix prices at which mantles should be sold to wholesalers and retailers. There was an agreement between some of the members of the Association with regard to prices, but the whole of the members of the Mantle Manufacturers' Association were not members of the body who sold at agreed prices. He agreed that a suggestion to the effect that travellers of British manufacturers found no competition from other British manufacturers because prices were fixed between them was substantially correct.

Mr. MACASKIE suggested that, if the British manufacturers had the market to themselves, protected by a very large duty, the price to the consumer would go up very considerably.

Mr. *Soper* felt certain that it would not; the British manufacturers were business men, actuated by ordinary commercial honesty. Even if they were not, however, they had in mind that the duty, if imposed, would be operative only during the pleasure of Parliament, and there might come a time when they would have to ask for it to be renewed.

Asked if he would agree that the German mantle was as good as the British, Mr. Soper said that when he had last compared them his tests had shown that the British mantles were slightly better, but not appreciably better, than the German.

With regard to the importance of the industry from the national point of view, witness said that mantles were used by 8½ million consumers. The number of people who benefited was more than 8½ millions. Another reason why the gas mantle industry was important was that gas at the present time was probably the predominant

source of artificial light in this country. Without the gas mantle, the gas as produced to-day could not be used for lighting.

Mr. MACASKIE pointed out that witness had said that a duty was necessary because the industry in this country was being destroyed by unfair competition, and he asked how it was able to exist before the war, when competition from Germany was keen.

Mr. *Soper* replied that the manufacturers could not carry on their businesses indefinitely in the way they were doing at present. Replying to further questions, Mr. Soper would not agree to the suggestion that the gas mantle industry was a declining one. He admitted that electric light was a serious competitor, but it had not made any material difference, so far as the manufacturers could see, in sales of gas mantles up to the present. If they lost sales in one direction, they picked them up in another; and it was everybody's experience that there was an increased sale of gas burners.

On the question of what was considered to be importation in normal and abnormal quantities, witness said that, having regard to the importance of the industry, he considered that 10 or 15 p.ct. of the total home consumption was a normal amount which might be allowed to come in. The duty should not be of such a heavy nature that it would exclude all foreign mantles, and if only 10 or 15 p.ct were coming in now, he did not think the present application would be made. Asked why he did not suggest that all imports should be stopped, he said he wanted to be fair; British manufacturers did not object to fair competition. He would not agree with Mr. Macaskie that the British mantle industry constituted a trust.

Mr. MACASKIE then put questions with regard to the amount of capital invested in the industry, and ascertained that it was turned over once in 2 or 2½ years at present values. He suggested that that was not a very satisfactory position for an efficiently-conducted industry. The capital invested was about 1½ millions.

Witness pointed out that large extensions of equipment had been made at war-time costs.

The CHAIRMAN said the point was that, if the manufacturers had to carry out extensions again, they would not do it when such high costs were prevailing. He agreed that the Committee had to determine whether the industry was carried on efficiently, but not whether the manufacturers had paid too much for their efficiency.

It was suggested by Mr. Macaskie that there was room for speeding-up production, but witness did not think so. The girls did an honest day's work for their wages, and he had not detected evidence of "going slow" in any factory. Mr. Macaskie suggested that output might be improved by about one-third without much difficulty, but Mr. Soper considered that impossible. Witness did not agree that there were at present too many mantle factories, and that the best two factories could cope with the present home consumption more efficiently and more economically than the existing six factories. In his view, the factories now running could supply the whole of the home demand comfortably, working on full time.

Suggestions were then made by Mr. Macaskie that the German mantles imported into this country were actually offered for sale at 24s. or 25s. per gross, which would compare with the 26s. per gross, the lowest price at which British mantles were offered. Therefore, it was ludicrous to suggest a flat-rate duty of 10s. per gross on German mantles. Mr. Soper did not agree, because the price of 24s. or 25s. represented a profit on re-sale.

Asked by the Chairman why he did not object to Dutch competition, witness said that *bona fide* Dutch competition was very small, and, to be perfectly frank, the manufacturers felt they would have more difficulty in making out a case against Holland than against other countries. As to the possibility of sending British mantles to Germany, he said the import duty into Germany was about 8s. or 8s. 6d. per gross, and nothing but price prevented British manufacturers from selling in Germany. As to the suggestion that the British mantle manufacturers controlled the thorium trade, witness said that one of the mantle manufacturing companies had an interest in thorium, but did not control the price.

In re-examination, witness said that if the demand on the thorium nitrate, ramie yarn, and clay ring factories in England were decreased, they might have to close down, or charge more for their products. He knew of one ramie yarn factory and two or three thorium nitrate factories which had closed down, due to decreased output.

OPPONENTS' EVIDENCE.

Mr. *George C. Sharp* (Agent for the Export Gasglühlicht Gesellschaft, of Berlin) said in evidence that he sold mantles for the German firm to wholesalers and retailers in this country. He handed-in a confidential statement showing the number of mantles which he had sold since 1922, and the prices at which he had sold them. The average import prices of German mantles in 1924 and 1925 which had been given by the applicants, and taken from the Customs returns, he did not regard as representing accurately the prices at which the mantles were sold or offered for sale in this country. They were misleading because they were average prices, and did not state what mantles were referred to. Cheaper mantles than the ordinary standard mantles were imported from Germany; and if they were included in the Customs returns, they would reduce the average prices. Though he had heard statements as to the obliteration of the statement of country of origin on boxes containing foreign mantles, he had not found evidence of this.

MR. TALBOT CROSS-EXAMINED.

Mr. *H. Talbot* (General Manager, Welsbach Light Company, Ltd.) was recalled for cross-examination. At the request of the Committee, he handed in the balance-sheets of the Welsbach Company for the last five years.

The CHAIRMAN, after examining these, said the dividends had been reduced from 15 to 5 p.ct., and a dividend was still being paid on the ordinary shares, chiefly out of reserves.

Witness was cross-examined by Mr. Macaskie as to the information he had given at the previous hearing regarding the wages paid in German factories, and it was suggested that the information was inaccurate. Mr. Talbot said he had every reason to maintain confidence in his figures. He did not wish to disclose publicly the sources of his information, but handed to the Committee a confidential statement of that information, showing the sources from which it was obtained.

With regard to wages paid to girl employees in Germany, Mr. Macaskie said that the amount paid to workers under 19 years of age was 5d. per hour, as against the figure of 2·78d. given by Mr. Talbot, and for those over 19, 5½d. per hour, as compared with Mr. Talbot's figure of 4¼d.

Questioned as to the prices at which German mantles were sold in this country, Mr. Talbot produced copies of reports from travellers of the Welsbach Company relating to customers who had bought German mantles, and stating the prices at which they were bought. These prices ranged from 18s. to 28s. per gross.

OPPOSITION EVIDENCE RESUMED.

Mr. *Louis Scal* (Director of Messrs. Littleton, Rose, & Co., Ltd., General Traders, of London) gave evidence for the opponents, and said that before the war he was the sole selling agent in this country for the Auerlicht Company, of Austria. The Company did not import at present, because they could not make it pay. He also gave figures as to the prices at which that Company's mantles had been sold here.

The CHAIRMAN remarked that what they had to find out was whether the competition was unfair, and whether the English factories were efficient.

Mr. MACASKIE said he wanted to make it clear that the selling price of German mantles in this country was 24s. or 25s. per gross, as compared with the price of about 21s. which was given by the applicants as the selling price of German mantles.

The CHAIRMAN said the Committee were satisfied with that evidence.

Herr *Heinrich Zeigler* (Managing Director, Deutsche Gasglühlicht Gesellschaft, Berlin), in evidence, said that his Company produced 50 p.ct. of the gas mantles now manufactured in Germany, and before the war they controlled the Welsbach Company. The deposits of monazite sand at Travancore, which it was said were in German hands, had been lost to the Germans. Thorium was sold in Germany at present at 10s. per kilo, and the key industries duty when imported to this country amounted to 33⅓ p.ct. of that; on a gross of mantles it represented about 9d. He agreed that the price of ramie yarn was about the same in Germany as in this country. With regard to wages, he gave details of the increases which had been made since 1923, and said that the hourly rate paid to girls over 19 years of age, including the employers' contribution towards insurance premiums, &c., amounted to the equivalent of 6d. per hour, which compared with 6½d. per hour paid in this country. As to efficiency in Germany, he said that the quantity of mantles produced in a given time by a given number of workers had increased since 1923. He had not seen the Welsbach and Falk-Stadelmann works at Wandsworth and Earlsfield since before the war; but if they were at present equipped as well as they were before the war, he should say that his own Company's works were as good as those. His works in Germany were equipped with modern installations.

Dealing with the consumption of gas mantles in Germany, he considered that at present it was about half what it was before the war. In reply to Mr. J. Arthur Aiton (a member of the Committee) he said that he had not taken account of Germany's territorial losses, but, even taking these into account, he considered the reduction in the consumption of mantles was about 45 p.ct. His Company's exports to Holland had decreased since the war to a greater extent than the consumption in Germany had decreased.

Replying to questions by the Committee, witness said that labour represented about 30 p.ct. of the cost of production of the mantle. The wholesale price in Germany of similar mantles to those sold here at 24s. 6d. per gross was 21s. 6d. per gross. The carriage, freight, and insurance charges between the German factory and the English port of discharge were about 3s. per gross, so that his Company did not sacrifice anything between the two countries. As to the import duty on mantles imported into Germany, he was indifferent as to whether or not that was taken off. He was giving evidence in the present instance because his Company were responsible for more than 50 p.ct. of the mantles imported into this country.

The CHAIRMAN said he was not in a position to make a bargain, but asked witness whether, if this country and Germany entered into an agreement not to impose an import duty into either country, he would be prepared to beat the Britisher on his own ground.

Witness agreed. As to the number of employees, he said that two years ago, when labour was cheap in Germany, his Company employed from 1000 to 1100 workers; to-day they employed 760, and obtained a greater output.

The CHAIRMAN obtained a promise from the witness to produce at the next sitting of the Committee copies of the recent wages agreements made.

Witness, replying to Sir John Barran (a member of the Committee), said there was nothing in the nature of State control in Germany, and there was no restriction on export. With regard to the consumption of mantles, he said it was the experience throughout the world that less gas burners were used than previously, and that electricity was taking the place of gas for lighting. Great Britain might be an exception.

This concluded Herr Zeigler's public evidence, and he gave information to the Committee privately with regard to costs of production.

In the course of a discussion as to the evidence which will be heard at the next sitting, the Chairman said attention would be directed mainly to wages and costs of production abroad. Further evidence as to the selling prices of foreign mantles in this country, which the opposition have available, was held over for the time being, and will be given if it is considered necessary. Commenting on the question of the alleged deception of British users through the obliteration of the notice of country of origin from the mantle boxes, the Chairman intimated that this fell to the ground as soon as samples of these boxes were examined.

The Committee were of opinion that it was not necessary to hear evidence from Poland, though they did not wish to exclude it.

The Committee adjourned until Tuesday, June 9.

SOUTH SUBURBAN GAS COMPANY'S CO-PARTNERSHIP.

Meeting at the Crystal Palace.

On Saturday last, the co-partners from the various stations of the South Suburban Gas Company met each other and the Directors and officials, at the annual gathering at the Crystal Palace, which is always so much looked forward to by them as an opportunity of showing their faith in co-partnership, as a chance for social intercourse, and as holding out promise of a thoroughly enjoyable afternoon. This year's meeting proved no less enthusiastic, and no less successful in every respect, than its predecessors; but there was one matter on which keen regret was eloquently expressed and even more deeply felt—and that was the absence of Mr. Charles Hunt, who, as the Chairman of the Company, and a thoroughly staunch supporter all along of the enlightened policy which is followed in that undertaking, has endeared himself to all who are in any way connected with it.

Quite early in the afternoon, co-partners, with their wives and children or sweethearts, filled the large theatre in the Palace, and thoroughly enjoyed a concert by the Livesey Hall Silver Star Minstrel Troupe—a large company who proved themselves as expert in their parts as one could possibly wish, under the musical direction of Mr. G. Piper. At the co-partnership meeting which followed, Sir J. FORTESCUE FLANNERY, Bart., presided, and he was supported on the platform by the other Directors, together with the leading officials of the Company and of the co-partnership.

CO-PARTNERSHIP AS A CURE FOR UNEMPLOYMENT.

The CHAIRMAN, on rising, expressed his pleasure at seeing so large an attendance, and his regret—and the regret of all of them—that their dear old friend, Mr. Charles Hunt, was not well enough to be with them. His health had of late not been what they would all have desired. Every one of them would look forward to the possibility of his restored health, and his coming among them once again, with all that geniality and friendliness which had distinguished him for the last quarter of a century in connection with this Company. With each year, as it rolled by, their faith in co-partnership as a system and as a remedy grew and increased. They heard much in the present day about unemployment, and knew that there were something like a million or more of willing workers throughout the country who were without work, however gladly they would take it. It was a serious national misfortune—a problem most difficult to understand and to remedy. Orders were going abroad which a few years ago would have come to this country as a matter of course; and he had often marvelled that the great remedy which they and others in the gas industry had demonstrated by example had not been more generally adopted throughout the manufacturing trades of this great country. It was a remedy by which every worker had a direct interest in the ultimate results of his employment, so that if the whole enterprise was successful he would share in the profits, and feel that every exertion he had made had been a contribution to the common fund from which he is not excluded, as he was by the present system other than co-partnership. By this system of co-partnership, economic production would be increased. The gas industry had led the way, and the South Suburban Gas Company was well in the front rank. It was now nearly thirty years—certainly a quarter of a century—since he first became associated with the late Sir George Livesey in connection with co-partnership. It was just thirty years—from 1894 to 1924—that the record of co-partnership had existed in this Company. The total amount of bonus—quite independent of, and in addition to, the ordinary full standard wage—in these thirty years that has been distributed, not as a gift, but as a matter of contract and right, among the workers of the Company, had been no less than £108,000. This was a very large sum, even over a period of thirty years. To-day the co-partnership system of their Company had 66 pensioners, who held as stockholders £15,000, or an average of over £200 each, in the Company. People might talk about old-age pensions, and about what the State did for them, but where could one find anything equal to this? Here were 66 pensioners—not all of them of the full age, but some in bad health—and the Company did not say to these pensioners: "Have you got other money? Have you anybody else to help you?" Not at all. If they had a claim through age or the state of their health, never mind what they had in the Company, the pensions were awarded according to rule. There were certain very strict rules—and necessary rules, of course—so that justice might be done towards those who continued to work and produce the money that paid the pensions to those who received them. But whenever there was any doubt as to whether a rule applied, the benefit of that doubt was given in favour of the man, and against the Company. Another development to which he ought to call their attention was the reduced number of accidents in the course of the working. This reduction, he believed, might be attributed to several causes. First of all, as they gained experience, they got to know what to avoid so as to secure "Safety First." Secondly, the system of inquisition—of a formal examination—into every accident that took place, be it small or great as regarded injury to the man involved, was thoroughly and carefully carried out. Anybody was heard who could give testimony about the accident, or as to what could be done to prevent a similar happening in the future, and every possible investigation was undertaken. Now they were reaping the reward of this system, because the number of accidents had decreased; and he looked forward to the time when this decrease would be even greater than had been the case up to the present. The workers themselves saw that "Safety First" was a prime consideration—a duty to those who were dependent upon them, a duty to themselves, and a duty to the co-partnership system. A man should run no unnecessary risks. This recognition had been, as he believed, one of the contributing causes to the reduction in accidents—which testified also to the steadiness of the men and their very great care. He never came to a meeting connected with co-partnership without recalling the saying of Sir George Livesey, the father of co-partnership, that the worker was at first a slave, next a wage-earner, and then a co-partner or share in the enterprise. They had reached the third stage; but they had not yet reached the top. There were many good workers who were worthy of co-partnership, but who had not yet been afforded entrance into the nest. But the system was well established; and again he said if any doubt was raised as regarded rules on the question of the admission of any individual to co-partnership, this doubt would be decided in favour of the man, so that, after reasonable trial of his skill and his steadiness, and his worth and deserving to become a co-partner, the co-partnership agreement would be given to him.

CO-PARTNERSHIP FUNDS AND ACCOUNTS.

Mr. JOHN BAKER (Secretary of the Co-Partnership Committee) then submitted the co-partnership account for the year 1924, which showed that the amount of bonus credited to 1407 co-partners was £11,617—being at the rate of 4¾ p.ct. on salaries and wages. The savings exceeded the withdrawals by £1300. A summary of the co-partnership accounts from 1894 to 1924 showed total bonus credited £108,028; and net savings £23,711. With interest, &c., the total sum was £140,903. Of this, £111,754 had been invested in stock, leaving a balance of £29,149. In addition to this balance of £29,149, 1125 co-partners now held £84,988 of ordinary stock of the Company, and 66 pensioners £15,228 of stock. He again pointed out how important it was that all employees possessing over £100 should make a will. The number of accidents which occurred last year was much smaller than in the previous year. The figures were: Last year, 74 accidents, equal to 41 per 1000 men employed, as against 96 (or 60 per 1000) for 1923. This was a reduction of nearly one-third.

THE WORKS COMMITTEE.

Mr. F. CARTER (Secretary of the Works Committee), in presenting the report of the Committee, drew attention to a recent statement of Mr. Baldwin, that an employer who failed to comprehend human nature was not fit to be a leader of men—that the management of the concern was not scientific if it failed to recognize the man in the employ. Mr. Baldwin said that, if they were to make any progress, employers must recognize the necessity for consulting their employees to a far greater extent than they had done in the past; they should offer consultation to the workers on routine, management, and other questions. Again, Mr. Baldwin said there was room for a more intimate relationship in industry than had been experienced in the past. Well, the co-partnership system of this Company was a shining example of all, and more, of the things that Mr. Baldwin thought would stand for progress. They had had for many years that more intimate relationship to which Mr. Baldwin had referred. The Works Committee had always meant far more than mere consultation; they had had powers of a far wider nature than this. They had the power of making representations on behalf of all or any of the workers; they had power to negotiate any matter that came up; and there had been times when the Committee had even had judicial powers. The object and the motive with which the Committee started their work in 1918 were still their object and their motive. He hoped that before very long practically every employee in the Company would have an opportunity of becoming a co-partner.

On the proposition of Mr. T. ANSET, seconded by Mr. F. REED, the report of the Works Committee was adopted.

VIEWS OF DIRECTORS.

Dr. CHARLES CARPENTER remarked that he was very glad to have a chance of again expressing his belief in the principles of co-partnership. He had known Sir Fortescue Flannery for a great many years, and during the whole of that time as an ardent preacher and supporter of co-partnership; and it was a great pleasure to find that his enthusiasm grew greater the longer his association with co-partnership continued. He would also take the opportunity of adding his voice to the regrets which had already been expressed at the absence of Mr. Hunt. Like the Chairman of the present meeting, Mr. Hunt had loyally and consistently, from the very first day of his association with the Company, supported the co-partnership principle; and he thought it would be a kindly act on their part that afternoon to send a message to Mr. Hunt expressing the regret of all the co-partners at his not being present, and assuring him of their continued gratification at his loyal support over so long a period of the co-partnership principle.

Mr. W. G. WALLER seconded the proposal that they should send a letter of sympathy to their beloved Chairman. He also thanked Sir Fortescue Flannery and the other Directors for their very kind invitation to the co-partners that day. There were some present who had come over a hundred miles to attend; and this showed the great interest that was taken in these yearly gatherings. If co-partnership were universally adopted in this country, there would not be over a million of men out of work to-day. They must make of co-partnership a continued success, and then the prosperity of the Company would be assured.

The CHAIRMAN: I shall ask you now to vote upon the motion that a letter of goodwill and encouragement be sent to Mr. Charles Hunt, expressing thanks for his past services to us, and the hope that he will soon be among us again. That is carried unanimously.

Col. J. H. BORASTON also expressed regret at the absence of Mr. Charles Hunt, and his own belief in the principles of co-partnership. He thought these principles were extending gradually throughout the country. In a time of stress in industrial matters such as was now being passed through, men's minds—both employers and employed—were beginning to turn less to their rights and more towards their duties and responsibilities to each other. This, to his mind, was the underlying motive of co-partnership.

Mr. HAROLD GUNDRY remarked that a meeting of this description brought home to one the strength and vitality of co-partnership As each year came round, he thought they realized more and more the importance of co-partnership to the country. However great an optimist a man might be, he could not think that all was well with industry at the present moment. There was much unemployment. Unfortunately there were dissensions between capital and labour, and foreign countries were quick to notice their chance, and were hurrying to take advantage of the situation and oust this country from the markets of the world. The remedy was co-partnership, which links

together all parties in true comradeship. One of the most important ingredients of co-partnership was that there should be representation on the Board of Directors, because a man could not feel himself really in partnership if he had not, by himself or his representative, an interest in the management of the undertaking. What their Company had done other companies could do; and he hoped that before long every important undertaking in this country would adopt the great principle of co-partnership.

Mr. JOHN TERRACE (the Chief Engineer) and Mr. WILFRID WASTELL (the Secretary) made some observations particularly affecting the co-partners of the Company, after which a "Safety First" badge and several diplomas were distributed among the drivers of the Company.

Mr. MORRIS INGHAM proposed a hearty vote of thanks to the Directors for their attendance that afternoon. The co-partners, he said, looked forward keenly to these occasions, when they could meet not only their fellow workers, but also the Directors of the Company. [Applause.]

Following Sir Fortescue Flannery's acknowledgment of the vote, the company were entertained at high tea.

NEW GAS-WORKS FOR BURNLEY.

Mr. H. E. Byrne, of the Ministry of Health, conducted a Government inquiry at Burnley last Thursday into the Corporation's application for sanction to borrowing £250,000 for the construction of new gas-works at Old Hall.

The Town Clerk explained that, while the nominal capacity of the existing works was 4½ million c.ft., actually it was not possible to rely upon making more than 3 millions; and as the highest consumption in one day had already reached 3¾ millions, it was clear that the present plant was inadequate to meet the town's present requirements, not to speak of future needs. The total storage capacity was 5½ millions, or 1½ days' supply of gas. The outstanding loans amounted to £117,478. Last year there was a net profit of £28, against £13,827 the year previous. The Gas Engineer said this difference was due to a depression in the industry which had been felt throughout the country; and in consequence the Council had decided to increase the price of gas to cover any possible deficiency. The Inspector drew attention to the fact that the estimated total expenditure was £300,500; and the Town Clerk said that next month the Council intended to apply for aid from the Unemployment Grants Committee. They would then pass a resolution dealing with the difference.

The Inspector said the Council ought to face the facts squarely. The Town Clerk then asked that the application should be regarded as for £300,500.

The gas undertaking, it was stated, had contributed to the relief of rates since 1864 £297,426. The Council had already acquired 23 acres of the land required for the site of the new works. Referring to the old plant at Lanebridge, the Town Clerk said it was very much congested, and had no railway facilities, which meant dependence on canal transport. The Council were of opinion that new works were the most economical proposition, as the old plant, which was installed over thirty years ago, was in an unreliable condition. Maintenance charges consequently were very high, and risk of breakdown considerable; in fact, the Gas Engineer assured him that it would be difficult to meet existing demands if there was a breakdown.

There was no opposition to the application.

GAS EXHIBITION AT NEATH.

A highly successful gas exhibition was held recently by the Neath Corporation Gas Department, at the Gwyn Hall, Neath. The exhibition was opened by the Mayor (Councillor Richard Jenkins), who was supported by members of the Gas Committee, Mr. W. Clark Jackson (Engineer and Manager), and a number of engineers and managers of works in South Wales—including Mr. W. H. Johns (Swansea), Mr. J. H. Canning (Newport), and Mr. J. E. Kenshole (Merthyr Tydfil). The Mayor spoke of the energy and skill put into the gas undertaking by Mr. Jackson; and in the speeches of Mr. Johns, Mr. Canning, and Mr. Kenshole, reference was also made to the excellent work done by Mr. Jackson, both on the works and on the district—it being remarked that Neath ought to be proud of having such an Engineer.

The exhibition consisted of four demonstration rooms, set-out as dining room, drawing room, kitchen, and bathroom. They were furnished in a tasteful manner by the South Wales Furnishers, and fitted with the latest designs of gasfittings, gas fires, hot water equipment, &c. There were also a number of tableaux displayed around the hall representing the usefulness of gas, and two large stalls—one showing heating and cooking apparatus, and the other gasfittings. The cooker stall was arranged by Radiation Ltd., and the gasfittings by Messrs. Falk, Stadelmann, & Co., Ltd. Cookery lectures and demonstrations were given twice daily by Mrs. Dora Rea.

During the week it remained open the exhibition was attended by approximately 6000 people, and the turnover of business in sales amounted to about £1200.

A children's essay competition was also organized; 24 selected scholars (12 boys and 12 girls) from each of the schools in the district taking part in this. The essays were of a high standard, and caused great interest, as was shown by the large attendance of parents and scholars at the final lecture, at the conclusion of which the prize-giving took place—the prizes being presented by Mrs. Jackson, the wife of the Gas Engineer.

Excellent results have accrued from a series of lectures and demonstrations on the use of gas in cookery at the showrooms of the Alliance and Dublin Consumers' Gas Company. Miss Bonham Carter was the lecturer and demonstrator, and she had large and interested audiences.

WHESSOE FOUNDRY AND ENGINEERING COMPANY.

Satisfactory Results in Difficult Year.

The Fifth Annual General Meeting of the Whessoe Foundry and Engineering Company, Ltd., was held last Friday at 8, Frederick's Place, Old Jewry, E.C., Mr. H. S. SMITH-REWSE presiding.

Mr. S. LANGFORD (Joint Secretary) having read the notice convening the meeting and the report of the Auditors,

The CHAIRMAN said: Gentlemen,—I regret that our Chairman is absent to-day, owing to the illness of his wife abroad, and your Directors have asked me to take the chair in his absence. I presume that, as usual, I may take the Directors' report and accounts as read. [Agreed.]

The results of the past year are, I think, on the whole, satisfactory. At our last meeting we expressed the hope that the trade depression was showing signs of improvement; but, unfortunately, the outlook at present still seems far from clear. Prices are still very keenly cut; and it is only by the closest attention to efficiency and economy in manufacture that we have been able to maintain our profits on such a comparatively satisfactory level through a difficult period.

There are no alterations in our balance-sheet from last year to which I should draw your attention, except that our work in progress has fallen; but I am glad to tell you that since the date of this balance-sheet we have received our fair share of orders, which should keep the works employed.

NEW MANAGING DIRECTOR.

During the year we suffered a very great loss by the death of our Managing Director, Mr. Alfred Coates, who had been connected with the works practically since boyhood, and to whose energy and ability the success of the Company must in large measure be attributed. This loss at such a time of depression in trade was bound to increase our difficulties; and I think we should congratulate our management and staff on the manner in which, in spite of this sad event, they have succeeded in carrying on the work.

I am glad to say that we have been very fortunate in securing the services of Mr. R. B. Hodgson (who to-day is Director and General Manager of Messrs. Ashmore, Benson, Pease, & Co., Ltd.). He will join the Company as Managing Director on the 1st of July, when the Directors propose to elect him to a seat on the Board. Mr. Hodgson has had great experience of the trade in which this Company are engaged, and I am glad he is able to be present with us to-day.

I now beg formally to propose the adoption of the report and accounts. I will ask Mr. Cripps to second the motion; but before putting it to the meeting, I shall be glad to answer any questions.

The Hon. A. H. SEDDON CRIPPS seconded the resolution, which, in the absence of questions, was carried unanimously.

The CHAIRMAN: I now have pleasure in moving: "That a dividend of 10 p.c., free of tax, as recommended by the Directors, be paid for the year ended March 31, 1925;" and if you approve of this, the dividend warrants will be posted to-morrow.

Mr. CLAUDE M. SPIELMAN seconded the motion, which was unanimously approved.

Mr. HARRY CLAYTON proposed the re-election of Mr. H. S. Smith-Rewse as a Director, which was seconded by the Hon. A. H. SEDDON CRIPPS, and passed unanimously.

The Auditors (Messrs. Peat, Marwick, Mitchell, & Co.) having been re-appointed, the proceedings terminated.

Flats Specially Built for Gas Fires.

A new departure in flat construction which, owing to its great saving in costs, is likely to be widely adopted, is to be introduced in a block of labour-saving flats at Knightsbridge Court, Knightsbridge. The foundation is being laid in this thoroughfare of a ten-storey building, which will embrace sixty labour-saving flats of varying dimensions, each specially constructed for the use of gas fires. The chief novelty from an architectural point of view is the abolition of the chimney. In place of wide brick chimneys, narrow flues constructed with "Nautilus" cast-concrete gas flue-blocks will be installed. These blocks have been approved by the Ministry of Health and the London County Council. By dispensing with the ordinary chimney, structural economies will be effected. In doing away with foundation concrete, brick footings, projecting chimney-breasts, trimmers, skewbacks, arches, concrete hearths, and large brick chimney-stacks, it is estimated that about 500,000 bricks will be saved. On each stack the economy will be as much as £100.

Omagh Gas Undertaking.—The past year's working of the Omagh (Co. Tyrone) Gas-Works shows a profit of £1479, as compared with £1679 in the previous year, the decrease being attributed to a reduction in price of gas from 6s. 8d. to 5s. 10d., which came into operation in the March quarter, and the increased expenditure on gas cookers and retorts.

Nelson Gas Department.—In his report for the year ended March 31, Mr. James Mitchell, Engineer and Manager of the Borough of Nelson Gas Department, says that the net profit was £7277. The total quantity of gas made was 531 million c.ft., all of which was coal gas. The net income from residuals amounted to £20,715, compared with £25,078 last year, which gives a return of 15s. 4d. per ton of coal carbonized, as against 17s. 11d. last year. As compared with the previous year, ordinary meters show an increase in consumption of 1·77 p.ct., and prepayment meters 6·69 p.ct., making a total increase of 4·31 p.ct. The unaccounted-for gas stands at 4·1 p.ct. During the year 354 gas cookers, boilers, fires, &c., were sold outright, and 624 appliances on the hire-purchase system. The Brierfield installation of vertical retorts has been reconstructed, and the expenditure has been fully compensated by an increased production of gas and residuals per ton of coal carbonized.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Business has entirely failed to benefit from the Whitsuntide holiday, and many collieries extended the break beyond the Monday. Idle time has been more than ever rife, and notices are still being given almost daily. Prices have been lower than ever, and buyers who have orders to place for prompt shipment can more or less make their own terms.

It is becoming more and more obvious that the collieries will just have to carry on as best they can, and cut losses as far as possible, until the crisis which is bound to come at the end of the present agreement.

Gas coals, like all others, are in very meagre demand. Wear Specials quote 18s. 9d., and best qualities 18s. 3d. to 18s. 6d. f.o.b. These prices are purely nominal, and prompt sales are subject to negotiation. Seconds, likewise nominally, are 16s. 3d. to 16s. 6d. Unscreened coking is 15s. 9d. to 16s. 3d., and a very limited market; supplies of all qualities being freely offered. Best Durham bunkers are weaker, and obtainable at 16s. 6d. to 16s. 9d.

The loss to collieries at these f.o.b. prices amounts in most cases to shillings a ton, and still they are too high to compete successfully for such limited business as is offering in the Continental markets.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

There is no material alteration in the Yorkshire and Lancashire coal trade this week.

Gas coals continue to be placed on the contracts over twelve months, and evidently there is a feeling that the next four weeks or so is the time to purchase owing to the general uncertainty likely to prevail throughout the trade during the next few months. Prices continue to vary, and there does not seem to be a generally stabilized price list, such as existed in more normal times.

House coal is naturally in small request, while there does not appear to be any improvement among the larger coal-consuming industries. The iron and steel trades may have a chance of recovering to some extent, seeing that furnace coke is now being put on the market at much reduced figures. This will enable British competitors to be more successful in the near future. Low prices continue to rule for the commoner grade fuels, and it remains to be seen what effect this will have after the holidays.

The shipping outlook continues abnormal. Although low figures are quoted for the various qualities, exporters report that there is no chance of an improvement for some time. With the possibility of increased working hours and the consequent reduction in the cost of production, it may be, however, that towards the latter part of the summer there will be an improvement.

The Humber bunker and export prices (f.o.b. usual shipping ports) are: South Yorkshire.—Hards, Association, 19s. 6d.; screened gas coal, 17s. 6d. to 18s.; washed trebles, 18s. to 19s.; washed doubles, 16s. 3d. to 16s. 9d.; washed singles, 15s. to 15s. 6d.; washed smalls, 10s. 9d. to 11s. 6d.; unwashed doubles, 15s. 6d.; rough slack, 10s.; smithy peas, 18s. to 19s. 6d. West Yorkshire.—Hartleys, 16s. 6d. to 18s.; screened gas coal, 16s. 6d. to 18s.; washed trebles, 17s.; washed doubles, 14s. to 15s.; washed singles, 13s. 6d. to 14s. 6d.; washed smalls, 10s. 6d. to 12s.; unwashed trebles, 16s.; unwashed doubles, 12s. to 13s.; rough slack, 9s. 6d. to 10s.; coking smalls, 9s. to 10s. Derbyshire and Notts.—Top hards, 19s. to 19s. 6d.; washed trebles, 17s. to 17s. 6d.; washed doubles, 16s.; washed singles, 14s. 6d. to 15s.; washed smalls, 10s.; unwashed doubles, 14s. to 14s. 6d.; rough slack, 9s. 6d. to 10s. Yorks, Derbys, and Notts.—Screened steam coal, 15s. to 17s.; gas coke, 19s. to 20s.; furnace coke, 15s. 9d. to 16s. 6d. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Many gas undertakings are anything but eager to complete contracts for the new term. The course of the market gives some encouragement to the belief that by delaying they risk nothing and may enforce better conditions. Colliery managements that take the market position as standardizing prices of gas coal at from 2s. to 3s. below those which ruled a year ago are being told that supplies can be arranged with some of their competitors at a reduction of 5s. This is considered an exaggeration of the slump.

It is evident that some collieries are prepared to shade late prices rather than lose contracts. Stabilized prices are not to be expected in prevailing conditions. But a drop of 5s. is considerably more than collieries generally are prepared to entertain. It is suggested that the price agreed last year for high-grade coal is being compared with the price now quoted for low-grade coal to arrive at the difference of 5s. Notwithstanding the suspension of output during the Whitsun holiday, supplies of all descriptions of fuel continue greatly in excess of demand. Values have, therefore, further depreciated.

Iron and steel producers have not sufficient orders to warrant more than a partial re-starting even of the plants that were in operation down to the eve of the holidays. Further closing down of pits appears to be inevitable, and at many of these where coal getting has been resumed working hours are being further curtailed.

The half-yearly meeting of the Lampeter Gas Company was held last week—Major Harford presiding. The Directors submitted their report and balance-sheet for 1924, which showed a profit of £291. It was decided to apply this towards the reduction of the accumulated debt of previous years; the Directors being unable to pay a dividend.

TRADE NOTES.

New Holder at Clevedon.

Messrs. Thos. Piggott & Co., Ltd., of Birmingham, have secured the contract for a three-lift gasholder and framing, to replace one of the existing holders at the Clevedon Gas-Works, Somerset. The work is to be carried out under the direction of the Engineer, Mr. J. Harger Pye.

Cambridge Instrument Company, Ltd.

This firm have published a new list describing "Cambridge" automatic temperature regulators. Readers of the "JOURNAL" will be interested in the apparatus described, which has important applications in practically every branch of industry. Though the catalogue deals almost exclusively with the regulation of temperature, the regulators described can be applied with equal efficiency to the automatic control of humidity, pressure, and other physical conditions.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 8.

There is no change to report in the position of pitch, the price of which remains **unaltered.**

Creosote also is unchanged at about 7d. to 7¼d. per gallon.

Solvent naphtha, 95/160, is 1s. 9d. per gallon.

Pure benzole and pure toluole is 1s. 11d. to 2s. per gallon.

Tar Products in the Provinces.

June 8.

Markets for tar products generally are still very dull. There is practically no business doing for prompt delivery, while prices ruling are generally so low that there is no inducement to manufacturers to contract for forward.

Pitch is still very quiet indeed. Sales are reported on the Continent on the basis of 39s. to 40s. per ton f.o.b. England.

Creosote is steady. There is not a very large demand for home consumption, while as regards export buyers appear to have covered their immediate requirements, and apparently prefer to wait before booking for the latter part of the year.

Benzole is in good request at full prices.

Solvent naphtha is in good demand, and contracts are reported to the end of the year at fair figures.

Carbolic acid crystals are still neglected, and crude carbolic acid is very dull and difficult to sell.

Naphthalene continues depressed by the prices quoted by Continental manufacturers.

The average values for gas-works products during last week were: Gas-works coal-tar, 26s. to 31s. Pitch, East Coast, 39s. to 40s. f.o.b. West Coast—Manchester, 34s. to 35s.; Liverpool, 35s. to 38s.; Clyde, 38s. to 39s.; Benzole, 90 p.c.t., North, 1s. 7½d. to 1s. 8½d.; crude, 65 p.c.t. at 110° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.c.t., naked, North, 1s. 7½d. to 1s. 8½d. Toluole, naked, North, 1s. 6½d. to 1s. 7½d., nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8½d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 1s. to 1s. 2d. Creosote, in bulk, North, liquid, 5⅝d. to 6d.; salty, 5⅜d. to 5⅝d.; Scotland, 5½d. to 5¾d. Heavy oils, in bulk, North, 6½d. to 7d. Carbolic acid, 1s. 5d. to 1s. 6d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.c.t., purely nominal; "B" quality unsaleable.

CONTRACTS OPEN.

Coal.

The Tipton Urban District Council are inviting tenders for the supply of 12,000 tons of gas coal. [See advert. on p. 757.]

The Denbigh Gas and Coke Company are inviting tenders for about 1900 tons of best screened gas coal. [See advert. on p. 756.]

The Teignmouth Urban District Council Gas Department are inviting tenders for the supply of 2500 tons of coal. [See advert. on p. 756.]

Tenders are invited by the Evesham Corporation for the supply of from 500 to 8000 tons of best screened gas coal. [See advert. on p. 756.]

Tenders are invited by the Keighley Corporation for the supply of about 35,000 tons of best screened gas coal, nuts, and slacks. [See advert. on p. 756.]

The Gas and Water Undertaking Committees of the Borough of Saffron Walden are inviting tenders for the supply of gas and steam coal. [See advert. on p. 756.]

Tar and Ammoniacal Liquor.

Tenders are invited by the Gas Committee of the Loughborough Corporation for the purchase of their surplus tar and ammoniacal liquor. [See advert. on p. 756.]

EXTENSIONS.

New Purifiers for Blackpool.

It is proposed to put down two new purifiers at the Blackpool Gas-Works, subject to the Unemployment Grants Committee authorizing a grant. This will entail application to the Ministry of Health for sanction to borrow £5500.

Questions Investors Should Ask.

One of the largest gas companies on the Pacific Coast recently issued a leaflet urging the advisability of prospective investors securing answers to the following twelve questions before placing their money in any enterprise of which they possess no personal knowledge: (1) Is the industry well established—that is, safely past the experimental stage—and showing a healthy growth? (2) Is the investment backed by actual physical property sufficient to justify the company's capitalization? (3) Has the security paid interest or dividends consistently over a period of years, and is it now yielding a satisfactory return, rather than carrying an indefinite promise of dividends at some time in the future? (4) Is the business stable in character, dealing in commodities for which there is at all times a ready market? (5) Is the territory in which the company operates progressive, presenting favourable opportunities for future development? (6) Does there exist an active market for the security, so that stockholders may sell their holdings at any time if occasion requires? (7) Has the business a sufficient working capital to meet any contingencies which may arise, even in those periods of industrial depression which inevitably occur from time to time? (8) Is the security of such character that your bank will accept it as collateral for loans? (9) What is the character of the company's management and personnel? (10) Is the enterprise of sufficient size to withstand the stress of active competition from other companies engaged in similar business? (11) Is there any assurance that the money paid for purchase of stock actually will be invested in the business, instead of going into the pockets of promoters? (12) Is complete information regarding the company's progress and operations available to stockholders?

Irish Gas Price Reductions.—The Newry Urban Council have reduced the price of gas by 5d., to 5s. 5d. per 1000 c.ft. Gas for heating and cooking purposes has been reduced in price by the Coleraine Urban Council by 5d., to 4s. 2d. per 1000 c.ft. In Strabane the price of gas has been reduced by 9d., to 6s. per 1000 c.ft.

Newbury Gas Department.—Owing to a reduction in the price of gas, the surplus on net revenue account for the past financial year of the Newbury Corporation Gas Department amounts to £281, as compared with £2452 for the previous year. The Auditor states that the cost of production and distribution compare favourably, and carbonization results show a substantial improvement. The percentage of unaccounted-for gas has been substantially reduced.

Malta and Mediterranean Gas Company, Ltd.—The audited accounts for the year ended March 31, which will be presented at the meeting next Tuesday, show that, after appropriating the sum of £4000 to reserve, the amount standing to credit of profit and loss account is £13,704. The Directors propose the payment of the dividends on the first and second preference capital, and a dividend of 3½ p.ct. (free of income-tax) on the ordinary capital—making, with the interim dividend, 6 p.ct. for the year.

Leek Gas Undertaking.—At a recent meeting of the Leek Urban Council, the report of the Gas Engineer (Mr. R. H. Ginman) for the year ended March 31 was considered and approved. It was recommended that the price of gas to ordinary consumers in Leek be reduced to 3s. 6d. per 1000 c.ft., less a discount of 6d. per 1000 c.ft. for prompt payment, and that the price to ordinary consumers at Rudyard be reduced to 4s. 6d., with the same discount. It was also recommended that the discount allowed to prepayment consumers in Leek be advanced from 5d. to 8d. per 1000 c.ft., and to prepayment consumers in Rudyard from 4d. to 7d. per 1000 c.ft. The net results of the year's working showed a loss of £1900.

Lytham St. Annes Gas Department.—The accounts of Lytham St. Annes Gas Department show a loss of £1381 on the year. The revenue was £57,284, and of this £37,879 came from the sale of gas, £14,221 from residual products, and £3594 from services, fittings, &c. Gas sales show a decrease of £2000, and those of residual products £500. The total expenditure was £46,846, compared with £57,168 last year, while the costs of manufacture were reduced to £32,863, from £34,263. Distribution expenses fell from £13,638 to £7341. This year the gross profits were £10,438, against £4598 last year; but sinking fund and interest charges were £11,819, compared with £7567. The net loss last year was £2950.

Progress at Workington.—Alderman F. Hall (the Chairman of the Workington Corporation Gas Committee), submitting the annual report of his Department to the Town Council, congratulated Mr. Hedley Hoy (the Engineer and Manager) on the results attained. He said the progress made was of such a character as could not have been possible unless the coal had been wisely selected, the carbonizing plant up to "concert pitch," and the management and employees keen and reliable. The make of gas had been nearly 183 million c.ft., or 7½ millions more than in the preceding year; the make per ton of coal having been 20,396 c.ft., or 479 c.ft. more. The gas sold per ton was 19,058 c.ft., or 82·1 therms. The vertical retort installation has worked satisfactorily during the year.

Price of Gas at Hereford.—At the last meeting of the Hereford Town Council, the Gas Committee reported that, "in consequence of the serious slump in the value of residuals, amounting in the financial year just ended to £1067, and of the estimated further fall in value of £2400 during the current year, the Committee were compelled to recommend the Council to increase the price of gas, as from June 24, 1925, from 4s. 3d. to 4s. 9d. per 1000 c.ft., less the usual discount of 3d. per 1000 c.ft. for prompt payment. A corresponding increase was recommended to consumers on the prepayment system—viz., by reducing the discount from 1s. to 6d. per 1000 c.ft." Mr. Oatfield, who moved the adoption of the report, in the absence of the Chairman (Alderman C. Witts), mentioned that, whereas the income from residuals per 1000 c.ft. of gas was 11d. in 1904, and 2s. in 1921, it was only 8d. last year. During the past two years, the Committee had endeavoured to give the citizens cheap gas, which had resulted in serious losses; and now they thought it fair to ask consumers to pay a reasonable price. The report was carried.

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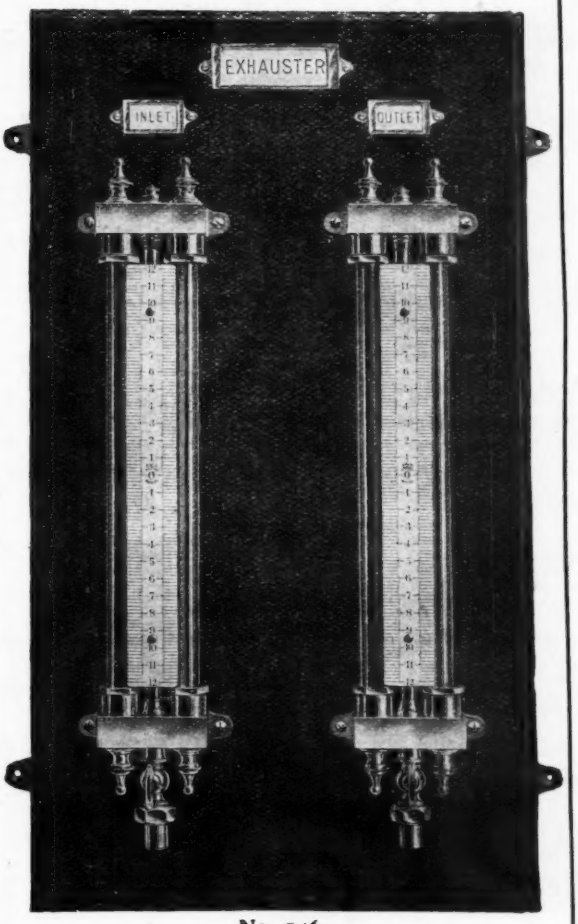

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STOCK MARKET REPORT.

THE weakness of gilt-edged stocks was the feature of the week on the Stock Exchange, for which various reasons have been assigned. The failure of the recent new issues and the possibility of a new conversion scheme being attempted are the principal of these reasons; but the fact remains that there have been many large sellers, and the absence of compensating buyers has resulted in a general depreciation all round. The outlook is not improved by the knowledge that other important loans will appear on the market at an early date. There is a silver lining to every cloud, and there were a number of purchases by trustees of stocks that are rarely available.

There is nothing of note to report in the other principal markets. Foreign Government and Foreign and Home Rails were all quiet. Industrials were colourless except the popular issues. Tobaccos, Real and Artificial Silks all improved. Courtaulds rose above the £5 mark. Imperial Tobacco, Dunlops, and Allied Newspapers all showed increases on the week. Electric issues have obtained a good deal of advertisement of late by reason of the various grandiose schemes that are being promulgated. The dividends have been gradually improving, but consideration should be given to the heavy capital expenditure that is being incurred.

Transactions in the Gas Market were less than usual, and the changes in the quotations were unimportant. The Imperial Continental ordinary is gradually losing the inflated value that arose out of the special distribution. The present average price—149½—on an estimated permanent return of 10 p.c. would yield 6·69 p.c.

An issue is announced of £8000 6½ p.ct. Irredeemable Preference Stock at a minimum of par by the Wells Gas Light Company.

The following transactions were recorded during the week:

On Tuesday, Alliance and Dublin 63, Commercial 3 p.ct. debenture 57¾, Continental Union 34, European 6⅞, 7, Gas Light and Coke 83¼, 83⅜, 84¼, 4 p.ct. preference 79, 79½, Hastings and St. Leonards 3½ p.ct. 75⅜, Imperial Continental 148, 150, 151, 153 *ex* div., Montevideo 68, Primitiva 9s. 10½d., 10s., South Suburban 5 p.ct. 95, Tottenham "B" 95.

On Wednesday, Gas Light and Coke 83⅛, 84, 84⅛, 84⅜, 4 p.ct. preference 79¼, Imperial Continental 147, 147½, 149 *ex* div., Montevideo 67, 68, 68½, Primitiva 10s. 1½d., South Metropolitan 93⅜, 94½, Tottenham "B" 95, 5½ p.ct. preference 104¼, 104½, Wandsworth 130, "B" 110, Epsom stock 112. Supplementary prices, Colonial Gas Association 7 p.ct. preference 18s. 6d., Gravesend and Milton 65.

On Thursday, Alliance and Dublin 65, Bombay 97s. 6d., British 111, Gas Light and Coke 83⅜, 83⅝, 84, 84¼, 3½ p.ct. maximum 62¾, 4 p.ct. preference 79, Imperial Continental 147½, 148, 148½, 148⅜, 149 *ex* div., Montevideo 68½, 68½, Primitiva 9s. 9d., 9s. 10½d., 10s. 3d., South Metropolitan 93½, 93¾, 94, 94½, 6½ p.ct. debenture 103½, Wandsworth "A" 130, "B" 110, 5 p.ct. Epsom stock 112.

On Friday, Bournemouth 6 p.ct. preference 11½, 11⅝, Brentford "A" 96¾, Brighton and Hove original 167, Continental Union 35¼, European 6⅞, Gas Light and Coke 83⅛, 83⅝, 84, 3½ p.ct. maximum 62½, Imperial Continental 149 *ex* div., Primitiva 9s. 9d., 10s., South Metropolitan 93½, 6½ p.ct. debenture 103¾, South Suburban 5 p.ct. 96, Southampton 5 p.ct. 80½, 80½, Supplementary prices, British, Norwich 3½ p.ct. mortgage debentures 62, 62½, Reading 5 p.ct. 82, 82½, Redhill "B" 82, 82¼, Southgate and District 5 p.ct. debenture 98¼, 98½.

Money was perhaps easier in Lombard Street. Old day-to-day loans were renewed at 3⅜ p.ct. and declined later to 3½ p.ct. The Treasury Bills average rate rose again from the previous week's rate of £4 6s. 4·48d. to £4 7s. 6·62d. p.ct.

The continued weakness of the franc dominated the Foreign Exchange Market. With both Paris and New York selling, the value fell to 103.05 on Saturday, finishing about a franc less. Belgian francs suffered in consequence, and closed at 104.10. Italian lire were 122½ to the £. Sterling on New York was very steady. Business was done at 4.86⅛, but closed at 4.86.

Silver was affected by Chinese sales, and the price for cash fell to 31⅜d. per oz. Gold remained unchanged at 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on March 5. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. June 5.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c. max. C.	78—81	..	
295,492	"	"			Do. 4 p.c. Pref.	71—76	..	..
1,551,868	"	Apl. 2	4	4	Alliance & Dublin Ord.	65—70	..	..
374,000	"	Jan. 8	6¼	6¼	Do. 4 p.c. Deb.	63—68	..	63—65
300,000	5	May 7	4	4	Bombay, Ltd.	4⅞—5⅛	..	..
170,000	10	Mar. 5	8½	8½	Bournemouth 5 p.c.	12—13	..	4⅞
425,050	10	"	7	7	Do. B 7 p.c..	12½—12⅝	..	..
150,000	10	"	6	6	Do. Pref. 6 p.c..	11—12	..	..
50,000	Stk.	Jan. 8	3	3	Do. 3 p.c. Deb..	56—59	..	11⅛—11⅛
162,025	"	"	4	4	Do. 4 p.c. Deb..	78—81	..	..
992,045	"	Mar. 5	6 1/10	6 1/10	Brentford A Con.	95—100	..	..
900,500	"	"	6⅝	6⅝	Do. B New	95—100	..	96⅛
76,000	"	"	5	5	Do. 5 p.c. Pref.	95—98	..	..
306,690	"	Dec. 18	4	4	Do. 4 p.c. Deb.	76—81	..	..
181,337	"	"	6	6	Do. 6 p.c. Rich. Red. Deb.	100—105	..	..
214,740	"	Mar. 5	12½	12½	Brighton & Hove Orig.	165—170	..	..
244,200	"	"	8¾	9¼	Do. A Ord.	122—125	..	167
1,287,500	"	Feb. 19	4	5	Bristol 5 p.c. max..	96¼—97¼*a*	..	..
855,000	"	Mar. 19	8	7	British Ord.	110—115	..	..
100,000	"	Dec. 18	7	7	Do. 7 p.c. Pref.	123—128	..	111
120,000	"	"	4	4	Do. 4 p.c. Red. Deb.	72—77	..	..
100,000	10	May 01	6	8	Cape Town, Ltd.	6¼—7¼*	..	..
100,000	10	Apl. 23	4½	4½	Do. 4½ p.c. Pref..	6—7	..	..
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb..	71—76	..	..
626,860	"	Feb. 19	6	6	Cardiff Con. Ord.	101—104	..	..
237,860	"	Jan. 8	7½	7½	Do. 7½ p.c. Red. Deb..	104—107	..	..
157,150	"	Feb. 19	5	6¼	Chester 5 p.c. Ord.	89¼—94¼*b*	..	..
1,513,280	"	Mar. 5	6	5/14/8	Commercial 4 p.c. Cap.	86—89	..	..
560,000	"	"	6	6	Do. 3½ p.c. Cap.	86—89	..	..
475,000	"	Dec. 18	5⅜	—	Do. 3 p.c. Deb.	57—60	..	..
800,000	"	14 Jan. 15	3	—	Continental Union, Ltd.	35—40	..	57½
200,000	"	Dec. 18			Do. 7 p.c. Pref.	88—92	..	34—35¼
660,000	"	Mar. 5	7	7	Croydon sliding scale	98—102	..	..
284,975	"	"	6½	6½	Do. max. div.	83—86	..	..
492,270	"	Feb. 19	5	5	Derby Con.	110—112*c*	..	..
55,000	"	Jan. 8	6	9	Do. Deb.	74—76*c*	..	..
1,002,180	I	Jan. 22	4	4	European, Ltd.	6¾—7⅛	..	..
16,460,070	Stk	Feb. 19	4	4	Gas Light & Coke 4 p.c. Ord.	83—85	·½	6⅞—7
2,600,000	"	"	5¼	5¼	Do. 3½ p.c. max.	62—65	..	83⅛—84⅜
4,062,235	"	"	3¼	3¼	Do. 4 p.c. Con. Pref.	78—80	..	62½—62⅝
4,761,930	"	Dec. 18	4	4	Do. 3 p.c. Con. Deb.	59—62	..	79 79½
130,000	"	—	3	3	Do. 10 p.c. Bonds	..	..	..
42,000	"	—	10	10	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	"	Mar. 19	7½	7½	Hastings & St. L. 5 p.c. Conv.	92—97	..	..
258,740	"	"	6½	6½	Do. 3½ p.c. Conv.	73—78	..	..
70,000	10	May 7	5½	5½	Hongkong & China, Ltd.	15½—16½	..	7½
86,600	Stk.	Mar. 5	10	10	Hornsey 7 p.c.	136—141	..	..
1,976,000	"	May 21	10	10	Imperial Continental Cap.	147—152*	..	..
263,950	"	Feb. 5	3½	59	Do. 3½ p.c. Red. Deb.	71—74	—3	147—153
235,242	"	Mar. 19	3½	3½	Lea Bridge 5 p.c. Ord..	96—101	..	..
2,127,340	"	Feb 19	6½	6½	Liverpool 5 p.c. Ord.	88½—89½*b*	..	..
600,000	"	Mar. 19	5½	5½	Do. 7 p.c. Red. Pref.	103⅜—104½*b*	..	89
165,736	"	Feb. 19	7	7	Maidstone 5 p.c. Cap.	122—132	..	..
63,480	"	Dec. 18	9	8	Do. 3 p.c. Deb.	53—58	..	..
75,000	5	Dec. 4	3	3	Malta & Mediterranean	4¼—4½	..	..
541,920	Stk.	Nov. 20	7	7	Montevideo, Ltd.	66—70	..	..
2,061,315	"	Mar. 5	4	4	Newcastle & Gateshead Con.	75—77*d*	..	..
300,929	"	"	5	5	Do. 4 p.c. Pref..	76—77*d*	—1½	67—68¼
529,705	"	Dec. 18	4	4	Do. 3½ p.c. Deb.	68½—69½*d*	..	..
15,000	"	Mar. 5	3½	3½	North Middlesex 10 p.c.	..	..	..
75,940	"	"	11	12	Do. 7 p.c.	..	..	..
300,000	Stk.	May 7	7 7/10	8⅝	Oriental, Ltd.	..	..	..
188,120	"	Jan. 8	9	7½	Plym'th & Ston'house 5 p.c.	100—105	..	..
60,000	50	Mar. 5	7	7½	Portsea Island B	109—114	..	..
100,000	50	"	13	14	Do. C	96—99	..	..
2,289,909	I	"	12	13	Primitiva Ord.	93—98	..	..
311,100	100	—	—	—	Do. 4 p.c. Red. Deb..	9/6—10/6	..	..
600,000	Stk.	June 2	4	4	Do. 4 p.c. Red. Deb. 1911	78—80*	..	9/9—10/3
820,335	"	Jan. 22	4	4	Do. B. Aires 4 p.c. Rd. Db.	64—66	—1	..
321,670	"	Dec. 18	4	4	Do. R'r P'te 4 p.c. Rd. Db.	65—67	..	..
150,000	10	"	4	4	San Paulo 6 p.c. Pref.	65—67	..	..
125,000	50	Mar. 19	6	6	Do. 5 p.c. Red. Deb.	7⅞—8⅛	..	..
270,000	Stk.	Jan. 2	5	5	Sheffield A	43—46	..	..
419,968	"	Mar. 19	5½	5½	Do. B	103—105*e*	..	..
1,047,000	"	"	5½	5½	Do. C	103—105*e*	..	..
90,000	10	"	5½	5½	South African	103—105*e*	..	..
6,609,895	Stk.	Oct. 23	8	6	South Met. Ord.	7—9	..	..
1,895,445	"	Feb 19	5	6½	Do. 3 p.c. Deb..	93—95	..	..
734,000	"	Jan. 8	3	3	Do. 6½ p.c. Red. Deb.	59—62	..	93⅛—91⅛
91,500	"	Mar. 5	6½	6½	South Shields Con.	102½—104½	..	..
1,187,795	"	Mar. 5	8½	8½	South Suburban Ord. 5 p.c.	135—136*d*	..	103½—103½
368,837	"	Feb. 19	6½	6½	Do. 5 p.c. Deb.	95—98	..	..
647,740	"	Dec. 18	5	5	South'mpt'n Ord. 5 p.c. max.	97—100	..	95—95
121,275	"	May 7	5	5	Do. 4 p.c. Deb.	80—83	..	..
250,000	"	Dec. 18	4	4	Swansea 7 p.c. Red. Pref.	72—77	—1	80¼—80¼
200,000	"	Mar. 5	7	7	Do. 6½ p.c. Red. Deb.	102—104	..	..
120,000	"	Dec. 18	6½	6½	Tottenham District A 5 p.c.	103—105	..	..
882,275	"	Feb. 19	8	8	Do. B 3½ p.c.	116—119	..	..
150,000	"	"	6½	6½	Do. 5½ p.c. Pref.	95—98	..	..
181,255	"	—	—	—	Do. 4 p.c. Deb.	103—105	..	95
258,251	"	Dec. 18	4	4	Tynemouth Con. and New	77—80	..	104½—104½
	"	Mar. 19	5	5	Uxbridge, Maidenhead, &	74—76*d*	..	..
197,294					Wycombe 5 p.c..	..	..	..
88,330	"	Feb. 19	6½	6½	Do. 5 p.c. pref.	95—100	..	..
91,800	"	"	5	5	Do. 5 p.c. Maidenh'd	95—100	..	..
	"	"	—	6½	Wandsworth, Wimbledon, and Epsom—	90—95	..	..
30,000	"	Mar. 5	9½	9½	Wandsworth A 5 p.c.	130—135	..	..
355,636	"	"	7½	7½	Do. B 3½ p.ct.	110—115	..	130
392,955	"	"	6/9/6	6/9/6	Do. C and New	95—100	..	110
352,000	"	"	7⅝	7⅝	Wimbledon 5 p.ct.	105—110	..	..
98,000	"	"	7⅛	7⅛	Epsom 5 p.c..	112—117	..	..
88,416	"	Dec. 18	3	3	3 p.c. Deb.	57—60	..	112

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